



Core FT1:

Business & Industry?, File 9 (1994 - present)
ABI/INFORM?, File 15 (1971 - present)
Gale Group PROMT?, File 16 (1990 - present)
Gale Group Trade & Industry Database?, File 148 (1976 - present)
Gale Group PROMT?, File 160 (1972-1989)
Gale Group Computer Database?, File 275 (full-text 1/1988 - present)
Business Wire, File 610 (Mar 1999 - present)
Business Wire, File 810 (1986 - February 1999)

Core FT2:

Dialog Global Reporter, File 20 (May 1997 - present)
The McGraw-Hill Companies Publications Online, File 624 (1985 - present)
Gale Group New Product Announcements/Plus? (NPA/Plus, File 621 (1985 - present)
Gale Group Newsletter Database?, File 636 (1988 - present)
PR Newswire, File 613 (May 1999 - present)
San Jose Mercury News, File 634 (Jun 1985 - present)
PR Newswire, File 813 (May 1987 - May 1999)

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Documentation and training productivity benchmarks.(Applied Research)

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SUMMARY

* Investigates how computer-industry companies create end-user documentation and training materials, and how they measure productivity
* Describes results of interviews of 11 managers of publications or training departments

Using a series of open-ended questions, the authors interviewed 11 publications or training department managers in various divisions of six firms to learn about their staffing, organizational structure, work processes, and benchmarks. We concentrated on groups supporting workstation and network products because we believe these segments of the computer industry will play an increasing role in the technology of the 1990s. Of course, the way each group operates depends on its own company's corporate culture and strategies, and different products require different documentation approaches. Therefore, the interviews centered on topics likely to be common to all the selected groups.

To obtain a balanced view of work processes and procedures, we interviewed several different levels of publications and training management. The smallest group had five members reporting to a supervisor; the largest group had over 1,000 members, with 14 people reporting directly to the top manager. Almost all managers interviewed were from large companies; 10 of the 11 managers were from companies with over 10,000 employees. All companies interviewed had more than one publications and training group.

Because of the highly competitive nature of the computer industry, most publications and training managers can't freely share quantitative or benchmark-type information. Since we were from an independent professional services firm known to managers in all the participating companies, we were able to assure all participants of anonymity. To help ensure this anonymity, we have scrambled the group identifications from table to table in this article, so that a group identified by a number in one table is not necessarily represented by the same number in subsequent tables.

In technical communication, productivity has many definitions; most involve a personally defined algorithm. In simplified form, our algorithm is

$$(\text{Quality} \times \text{Quantity}) / \text{Time} = \text{Productivity}$$

The key is defining quality (counting pages and tallying hours are easy). When defining quality, a manager supports corporate goals by placing weighting factors on elements such as technical accuracy, adherence to corporate graphic style, and usability by customers. In our interviews, we didn't ask managers to define productivity. Rather, we sought information about how (or if) they weigh key elements that help measure productivity. Technical communicators can compare this information to the factors they use in their own personal algorithms.

This article begins by describing the working environment in which the publications or training materials are created, then presents the

benchmark data, and finally uses the data to draw conclusions about applications for documentation productivity standards.

DOCUMENTATION TYPES AND AUDIENCES

All interviewed publications and training groups support application or system software products or both for their networks or workstations. Nine of the 11 groups also support hardware products ranging from peripheral units to central processing unit (CPU) internals. Most groups produce a wide variety of documentation, both printed and electronic (Table 1), but more software user manuals than any other type.

All 11 groups write documentation for end users, including engineers and programmers who are technically knowledgeable professionals but not computer workstation or network experts. They might use workstations to design automotive parts, simulate earthquake damage, or test application programs. Similarly, they use networks to communicate with other people working on their projects, or to leave their work on the network file server without having to worry about file backup.

Six groups also write documentation for managers and clerical people--nontechnical users who enter data or write reports, and who need "plain English" documentation to understand how the products help them do their jobs. Depending on their background and curiosity, these users may have little interest in technical **reference** manuals.

Nine groups write documentation for a technical "bridge" audience, consisting of system/**server** managers or network administrators; they may be technical experts or selected end users who receive additional training.

All eleven groups write documentation for service technicians who read the documentation to learn how to install the product. Eight groups also write for value-added resellers (VARs) and program developers.

Nine of the publications groups use marketing data about product positioning to plan task-oriented documentation, basing their procedures on a model of how realworld users will use the product. Of the remaining two groups, one primarily rewrites manuals prepared by another company and relies on that company for audience analysis. The other group writes documentation for engineers and programmers, and concentrates on technically accurate, easily accessible reference information.

STAFFING ISSUES

We collected information about documentation and training staff functions, qualifications, and reporting structure.

Staff functions and titles

Staff members performing similar functions have widely differing titles depending on the company and geographic location. A group's writers might be called communication specialists, information developers, information designers, technical communicators, authors, learning information developers, product information analysts, instructional designers (which implies a training background or function), documentation specialists, or technical writers. Five groups (45%) supplement their staff writers with freelance writers or contract technical publications service firms.

Some companies use different titles for positions that may have overlapping functional responsibilities. For example, some groups classify their instructional designers as writers. Five groups have specifically identified instructional designers on staff. The manager of one of these groups said that all their writers were instructional designers. The other four groups had instructional design specialists who design tutorials and instructional materials, and consult with the writers.

Classifying editing roles was especially difficult, because so many titles and functions overlap. Also, many groups use more than one type of editor. The interviewed managers defined four different types of editing functions:

* The developmental or project edit, which is performed by a senior editor collaborating with the writer from planning and writing through final review, Supervisors occasionally consult with the writers on

problems, but rarely edit to refine the conceptual or organizational approach. Only three groups (27%) use developmental editors.

* The "literary" or style edit, where the text is edited line by line to correct grammar and improve the communication quality. Seven groups (64%) use style editors.

* The copy edit, which may combine style editing (usually correcting specific grammatical errors) with checking all cross-references, ensuring conformance with corporate style and format standards, and preparing the text for final production of "camera-ready" pages. Four groups (36%) use copy editors.

* The production edit, which normally ensures conformance with corporate format standards, and may include light copy editing. In some groups, this editor also serves as final production coordinator. Six groups (55%) use production editors.

In two groups (18%), text-production specialists are responsible for coding, formatting, and producing the final text. Five groups (45%) are not supported by a text-production department or subgroup; their writers format the text and prepare the final camera-ready pages. Another four groups (36%) obtain text-production services "on loan" from a production department. The four groups using loaned text-production services and the two groups that have text-production staff also contract some of their text-production work with outside support firms (vendors).

With respect to graphics, four groups (36%) do not use graphic artists at all: their writers create all illustrations and do text-production work. preparing the final camera-ready pages. For specific projects, some groups request "loaner" artists from other departments.

Important staff qualifications

The interviewed managers emphasized different skills and attributes for writers and editors. Eight groups (73%) rated technical knowledge highly; however, seven groups (64%) stated that they can teach their technology more easily than they can teach people how to write. Many technical writing assignments require interviewing and meeting skills, and five of the managers (45%) rated "people skills" as an important qualification.

Because the groups use their editors differently, qualifications for editors cover a wide range of skills. Only four of the nine groups that have editor qualifications ranked language or grammar skills. Only two groups see editors as having a distinctly different skill set from writers. The most common description of the editor's qualifications "same as the writer's qualifications, but with better people skills."

Table 2 lists how the managers prioritize qualifications for writers and editors. Each manager was asked to volunteer three top qualifications, not select them from a prepared list. (Table 2 is presented in order of number of managers who ranked each qualification their first priority.)

Reporting structure

Most of the interviewed groups report to other managers, senior managers, or directors within the engineering or marketing divisions. However, four groups report to a vice-president (or comparable-level executive) whose title reflects responsibilities for publications and training, three of them under the aegis of technical services or technical support.

Also, technical publications and training groups are regularly moved within the corporate hierarchy. Seven groups (64%) have had their reporting structure reorganized within the last 24 months. However, one group has not changed its reporting structure in over 12 years.

Most groups have good relationships within their own reporting hierarchy and less satisfactory relationships with other departments, who may not understand the skills and efforts needed to produce publications and training materials. Table 3 shows how the managers rated their group's relationships with other departments. Ratings marked with an asterisk (*) represent relationships within the same reporting hierarchy. The interviewed managers described their relationships in their own terms. In a

"client/vendor" relationship, the group "bids" on projects, sometimes competing against outside vendors. If the "client" department accepts the proposal, the group is awarded the project.

DOCUMENT PREPARATION

For most documentation projects, the functional specification is the original source of technical information. Some groups occasionally receive software source code listings, and one group receives **under license** product manuals written by another company, which they then rewrite as part of their system manuals.

Because modern technical communication theory is based in part on human factors and cognitive psychology, specialists within the publications and training groups are often able to help their companies create more effective user interfaces and improved product functionality. Some companies recognize that documentation is part of the product and value this early input from the professionals who explain the product's use.

Five of the groups (45%) work as collaborators with their product developers, contributing early in the product's design by offering insights into both the user interface and the basic functionality of the product. Nine groups (82%) review the functional specification and can suggest improvements to the user interface and--occasionally--the product functionality.

Table 4 shows the groups' levels of participation in the product development process, as well as how each manager rates the amount of change a functional specification undergoes during the development of a typical product.

Working procedures

Although each group is unique, all groups' working procedures share a high degree of commonality. For typical manuals, writers receive some form of source information (for example, functional specifications); they prepare at least two drafts of the manual; they coordinate with others who formally review the drafts at least once; they occasionally test the documentation; and they revise and prepare it for printing. Economic pressures and new tools have created procedural changes. Writers and trainers have learned new skills and now often perform functions traditionally carried out by others.

Seven of the groups (64%) use text databases from which the writers extract generic text for their manuals. One very large group believes that its writers can find in their database up to 80% of the text they need for a new manual. These groups see no lack of informational focus in the predominantly generic manuals, nor diminished value as pre-sales marketing aids.

Four groups (36%) have eliminated graphic artists over the last four years. They limit page-format designs to three or four templates (style sheets). The original staff artists created stock art databases before they left, which the group now updates with the help of freelance artists. Writers select illustrations from these databases and modify them as needed. Three of these four groups see no drop in quality when using this procedure. One group noted a few cases where the generic solution was not effective, but said that the cost savings justified the approach.

Typical working procedures include a quality control process to ensure that the final text is accurate and appropriate for the target audiences. Quality control always includes a formal draft review procedure, and frequently a document-verification process to check the accuracy of the procedure in the manual against the working product (64% perform document verification routinely, and the remaining 36% occasionally). Four groups (36%) regularly perform usability testing, and another two groups occasionally test the documentation to ensure that it is usable by the target audience.

All groups review typical manuals two to four times before final text production. During early reviews, the review team might be the writer's supervisor and the lead product developer. However, all groups hold at least one formal review during which all interested parties review,

annotate, and sign off on the manual. The number of reviews and the members of the review team vary depending on the type of manual and whether the project is an update of an existing document or a new manual.

Four groups have text-production departments or use outside text-production vendors regularly. The writers or copy editors pass their final files to the production department (or to the vendor), which is responsible for final formatting, merging art files with text files, and preparing the files for a specific output device (usually a laser printer or phototype-setting equipment) using page formatting software (for example, Interleaf, Ventura Publisher, or PageMaker).

In seven groups, writers do all or most of the final text production, although two of those groups occasionally use outside text-production vendors. One of these groups acknowledged lowered writer productivity when their writers performed final text production.

Technical specification "freeze" dates

For the majority of their projects, the groups negotiate with the product development team on a date after which the product technical specification is "frozen" and they will no longer accept changes to the product functionality or user interface without corresponding slips in their delivery schedules. Despite this process, late technical changes are a way of life in the computer industry.

Therefore, most groups add schedule "float" to accommodate late changes. One manager said that they add "lots of white space" to their schedules. Another manager expressed frustration with the scheduling exercise, noting that "no one pays attention to it."

Table 5 shows when groups try to schedule the technical specification freeze date and how often they are successful in staying on schedule. Note that freezing the specification later in the document production process does not improve the chances of avoiding last-minute changes.

Documentation usability testing

All groups acknowledge that usability testing can improve documentation quality, product quality, and user satisfaction. However, only four groups routinely follow a formal testing program. One other group defines its draft text reviewers as "testers" and thus defines their normal review process as testing.

Each group has its own definition of documentation testing. The four major levels of testing are

- * Checking by the quality assurance department to ensure that the manual accurately reflects the most current version of the technical specification or product (six groups, 54%).

- * Document verification of the procedures by a fellow writer or editor to ensure that the product works the way the manual says it does (nine groups, 82%).

- * Documentation usability evaluation by the supervisor or an experienced publications consultant to suggest conceptual, organizational, and stylistic revisions to improve the document (two groups regularly, 18%, and four groups occasionally, 36%).

- * Usability testing performed by human factors and cognitive psychology specialists in a laboratory setting, studying an average of six test subjects (matching the target audience) using the product to perform real-world tasks. Training groups use a similar testing approach, sometimes called "pilot testing," during which the instructional design of the course and the training materials are evaluated (four groups regularly, 36%, and two groups occasionally, 18%).

Working procedure problem areas

Each group faces repeated challenges while implementing its working procedure. Nine groups (82%) find schedule slips by product developers their number one headache. In descending order of occurrence, major problem areas are

- * Product developers not meeting their schedules, leading to high stress, overtime schedules, and increased sick leave for writers.

- * Product management or marketing changing the product definition, either by changing functionality or by redefining the user audience.
- * Lack of accurate input and support from product developers when defining the project documentation and training scope, leading to resource allocation problems.
- * Not being given enough time to do a good job.
- * Trying to stick to the process.
- * Pressure to work "ahead of product developers' input, leading to extra draft cycles to make the manual reflect the final product.
- * Final text-production bottlenecks when the pressure to get the manual printed is most intense.
- * Lack of sufficient editing and text-production support for the writers. Managers say writers need more than desktop publishing tools; they need to concentrate on writing.
- * Being organizationally placed in the wrong reporting structure.

BENCHMARKS

After collecting information about the working environment, we asked each group about its productivity benchmarks. Although all groups had good access to their basic information (such as group size and project process data), quantitative information on estimating procedures and productivity standards was more difficult to obtain.

Group size benchmarks

Table 6 shows ratios for the subject groups. These ratios show the relationship of persons giving support to the person receiving it. The information source developers ("developers" in the table) include programmers and engineers who produce specifications and develop products to be documented. Columns marked with "n/a" represent data that was either not applicable or not available.

Note that the estimates were supplied "off the cuff" by the interviewed managers, so not all the Table 6 numbers are consistent. Also, some groups estimated their ratio of writers to source developers on the basis of the number of developers they actively supported, while reporting the total number of developers as a larger group (many of whom they rarely supported).

The number of source developers supported was the most difficult question for the managers to answer, because some groups supported only parts of engineering or programming departments. Therefore, most managers made "educated guesses."

The ratio of instructional designers to developers varies widely because one group identifies all its writers as instructional designers. The other three groups have instructional design specialists who serve as consultants to the writers.

Some of the above ranges are very wide because the groups depend on outside vendors for some of their writing, editing, art, or text-production support. If, for those ratios, we use only the data from groups where all the work is done by in-house staff, we come out with ratio averages of

Writer to developers	1:11
Staff editor to writers	1:9
Staff artist to writers	1:8
Staff text production to writers	1:11

Document statistics

All the groups are asked occasionally to prepare atypical documents: for example, brochures or special reports. However, their normal working procedures (and staffing) are based on preparing and delivering "typical" documentation for the products they support. Table 7 presents data about these typical documents.

The document lengths were relatively consistent; however, some inconsistencies emerged. One group reported writing a reference library (which they consider one document) that is over 13,000 pages long; this figure is not included in Table 7.

Estimating procedures

Ten of the eleven groups (91%) write documentation plans that

describe the general content and goals of the document; they include size and schedule estimates. Two groups write plans that are proposals to the engineering department, which can decide to accept the proposal or use outside vendors; these plans include cost estimates.

Table 8 shows the average advance notice each group receives before they have to prepare a plan. Table 8 also shows how the managers estimate the size and schedule of a typical documentation project. The first estimating approach taken is marked "1" and the second is marked "2." Ten managers (91%) first make a "gut-feel" estimate based on personal experience with similar documentation, then collaborate with the assigned writers to create more detailed estimates of project feasibility, given the target completion date. Finally, Table 8 identifies what criteria each manager uses to make estimating decisions,

When projects are ready to start (usually later than specified in advance plans), the managers negotiate with their staffs the working procedures to complete each document by its target date. Three managers said that they wish they had time to create an estimating algorithm with weighting factors for each of the project variables, such as ship-date reliability, source-information accuracy, and the potential for staff heroics (overtime) to accommodate late changes. Two managers said such an algorithm would be useless, because each project is so different that they would spend too much time guessing about the factors involved.

Productivity standards

One of the primary goals for this research project was to determine how publications and training groups in workstation and network companies measure their productivity. Each manager was asked, "How do you measure your department's productivity? Do you have productivity standards for writing and editing?"

The major measurement used is the ability to meet scheduled delivery dates. Groups that track budgets measure the ability to stay within budget, and some groups use usability lab feedback to help determine productivity. In Table 9, the number 1 represents the primary criterion used to measure productivity and the number 2 the secondary criterion.

One group sees productivity metrics as dangerous. They once tracked pages per year per writer, but found the algorithm of little value. They believe that focusing their efforts on customer satisfaction is more important than counting departmental pages-per-week throughput. Another group measures individual productivity through a series of weekly one-on-one meetings between the writer and his or her supervisor, during which they assess progress against the previous week's established goals.

One group previously used a target writing rate of one to two days per page (total, all drafts), but found the rate artificial and decided that it did not relate to the way they wanted writers to work. Another group expects about three new manuals or nine revised manuals per year per writer, but this general guideline is contingent on the topics being described.

Two groups track the actual cost of preparing a manual and compare that number with the estimated cost. When actual costs exceed estimated costs by a predetermined amount, they explore the cause. Five groups track the number of hours charged each week by their staff, but more for departmental budget and payroll purposes than for productivity measures. One group has a "crude" spreadsheet-based tool for estimating and tracking cost per hour and cost per page on a monthly basis for writing, editing, art, and text production. However, they do not use it because they find the data of little value in their schedule-driven environment.

During the interviews, each manager stated that he or she believes that productivity standards based on physical units of measure, such as pages written per day, are actually counterproductive to their goal of quality documentation. Many stated that page-count metrics do not support a team atmosphere.

Rather, their writers are salaried, responsible professionals who "own" the books they are writing. The writers collaborate on developing the

schedule and content plan. Then the writers do whatever is necessary (for example, work overtime, negotiate schedule slips, or find efficiencies) to make up for any misestimates, or for product development changes, while still meeting the schedule. The writers know that they will be evaluated eventually against quality and usability standards during project postmortems.

Key management issues

Table 10 shows each manager's key management issues and how he or she ranked them. Issues marked with a dash (--) were not mentioned by that manager. Note that although the managers were given a few examples, they were not offered a list of issues from which to choose.

From the context of the interviews, "project management" means managing the creation of a document across functional lines to ensure conformance to the documentation plan and schedule. It usually involves lining up adequate resources and solving "people problems."

Two managers were willing to create a second list where they reordered their key issues according to the amount of management time they spend on each. These two managers spend more time (up to 50% of each day) in project management. They "fight" with things like the production tools that writers are using to format text and other "distractions" that keep writers from being productive. One manager said, "I know I should be saying quality and customer satisfaction are the top issues ... but the truth is, I don't get time to concentrate on them."

SUMMARY

This research project had two primary goals: first, to create a better understanding of the working environments and procedures within documentation and training groups that support computer workstation and network products; and second, to determine how (or if) these groups measure their productivity.

With respect to the working environment and procedures in the computer workstation and network companies interviewed, the "average" documentation and training group:

- * Supports predominantly software products with user, reference, and installation manuals (and often with some form of tutorial) for a generally technically educated or trained audience

- * Hires mostly experienced writers and provides them with small amounts of editing, art, and text-production support Reports up through the organizational chart to an engineering vice-president, and is reorganized every two years

- * Frequently contributes as members of the product development team, and usually reviews technical specifications

- * Supports eleven developers per writer

- * Uses a formal documentation-planning process to define projects which average 200 pages for a user manual and 600 pages for a reference manual

- * Submits drafts for three review cycles, resulting in changes to more than three-quarters of the text

- * Routinely performs limited quality-assurance checking, and occasionally performs documentation usability testing

- * Rarely receives a technical specification that stays frozen after the target freeze date, and therefore suffers high levels of stress as the schedules slip

- * Negotiates schedules between writers and developers to support the product ship dates

- * Estimates projects using experience, and schedules milestones based on product test and ship dates

- * Although concerned with quality, usually finds schedule demands a higher priority.

With respect to productivity standards, the "average" technical publications and training group uses informal productivity estimates based on progress meetings with the writer or writing project manager, followed by a "postmortem" analysis of how successful they were in meeting the

schedule and specific quality goals. No interviewed group currently measures the writing process in terms of hours per page or pages per day.

DISCUSSION

Technical publications and training managers may find the results of this research project useful while discussing departmental structure and goals with corporate management, especially when negotiating for adequate resources and realistic schedules. However, it is important to inject a word of caution.

When we asked interviewees about their key management issues, "quality" dominated the discussions. Most events (from slipping schedules to changing specifications) were described in terms of how they affected quality. On the **other** hand, productivity **data** was virtually nonexistent, except in terms of meeting schedule dates, and was judged detrimental to the creative process.

Modern corporate executives recognize the value of customer satisfaction. They know that their products are easier to use when supported by high-quality documentation and training. However, they face business pressures to improve quarterly profits, resulting in budgetary and schedule pressures on the entire company, including publications and training groups.

These same executives live in a world of statistics, and are used to making decisions based on numbers. Any manager's statements regarding the quality of his or her group's work and its productivity are perceived as only "soft" opinions unless backed up by quantitative data. Documentation managers can use quality and productivity data tools to secure top management support, regardless of the data's usefulness in department management.

Quality issues

Everyone agreed that quality should be the top priority. Yet the definition of "quality" differed among the interviewed managers. In some groups, quality assurance meant verifying the accuracy of the installation procedures or having another writer perform a "peer" review. In other groups, quality was enforced through a set of clearly defined procedures consisting of a planning phase (including an audience and task analysis), text development based on real-world usage scenarios, formal documentation usability testing and revisions to incorporate beta-test-user and customer-support-services feedback.

Also, the commitment to quality varied with each company and its schedule issues. One manager described in accurate detail the procedures for a formal documentation usability test, but when asked where in their process testing was performed, commented that they never really had time to test.

Only four groups (36%) routinely perform usability testing, producing feedback they use to revise the manual before its release to customers. One of these four groups also participates in a division-wide committee developing an extensive set of documentation-quality metrics (ratios of graphics to text, index entries per concept, and so forth) to be checked before publication.

Hard data (from usability-test reports or documentation-evaluation checklists) places the definition of quality in the context of a scientific baseline; such data could give the entire technical communication process enhanced credibility with management, especially engineering management.

Productivity issues

The groups share a belief that productivity benchmarks are counterproductive to the goal of producing good documentation. One manager believes that productivity metrics are dangerous, because they shift the focus from quality issues to writing-rate averages. Another group tried measuring writing rates, but projects always took twice as long as estimated, so they gave up estimating.

Yet all the groups report that shifting delivery schedules and changing technical specifications wreak havoc with their attempts to ensure quality. Ongoing requests for documentation changes are a problem for all

groups, who usually must respond to such requests for changes without delaying the delivery- schedule.

By tying quality standards to productivity metrics, managers could create effective tools to "push back" against unreasonable schedules. A manager armed with hard data from customer support records could show how a 200-page manual "crunched out" in a week (bypassing the usability-testing program) resulted in negative customer feedback and excessive calls to the customer-support hot line. Similarly, managers could track specification changes by developers and tie them to increased writing time. Without such numbers, the manager has only an opinion, rather than a powerful justification for sensible schedules.

The interviewed managers also showed little concern about the effects of overtime on their budgets, because their writers are salaried professionals. However, they are aware of the associated excessive sick leave and high stress levels from constant pressure to meet tight deadlines. Currently, some managers mask the effects of unreasonable schedules by pouring even more overtime hours into the project, ensuring that they meet the deadlines even if they "leave a few bodies along the roadside."

Using productivity-tracking tools, publications managers could show corporate management how both quality and quantity of work produced per person will decrease during "crunch" periods, resulting in more review/revision cycles and increased editing support costs.

Productivity information is a management tool that does not need to interfere with team spirit or a writer's "ownership" of manuals. If the manager is standing over a writer's shoulder monitoring hourly output, of course the writer will lose creative impetus. However, managers can routinely review time sheets and project progress reports, then use the data to protect writers' **rights** to sufficient time to develop and test their work. Such an approach could make productivity data a valuable asset for the entire group.

CONCLUDING REMARKS

This research project was tightly focused on working processes, productivity benchmarks, and management issues: it was limited to managers of eleven publications and training groups in computer workstation and network-product companies. Therefore, this article should not be taken as a broad-based survey of the computer industry or the technical communication profession.

The goal of these interviews was to gather data on how managers weigh key elements in defining productivity, not to pass judgment. We believe the project yielded interesting data that managers can use to compare with their own productivity algorithms; but of equal interest is the information that was not available.

As discussed previously, the managers disdained quantitative productivity measurements. Despite the economic pressures facing the computer industry, few of the managers used establishing and meeting project budgets (versus departmental budgets) as a productivity measure.

All the interviewed managers share a common goal: to support their company's products with high-quality documentation and training materials. We believe that data from usability testing and quality metrics, combined with quantitative productivity standards and financial data, could help convince corporate management to provide the necessary resources to achieve that goal.

TABLE 1: DOCUMENTATION PRODUCED

Printed					
Group	User	Ref	Installation	Tutorial	Other
1	Yes	Yes	Yes	Yes	
2	Yes	Yes	Yes	No	Service Guides
3	Yes	Yes	Yes	Yes	Hdw Tech Ref

4	Yes	Yes	Yes	No	
5	No	Yes	Yes	Yes	Sys Internals
6	Yes	Yes	Yes	Yes	Admin Guide
7	Yes	Yes	Yes	Yes	Hdw Tech Ref
8	Yes	Yes	Yes	Yes	
9	Few	Yes	Yes	No	Brochures
10	Yes	Yes	Yes	Yes	
11	Yes	Yes	Yes	Yes	

Magnetic Disc Online

Group	Help	Manuals/Tutorials	Other Media
1	No	No	
2	No	No	
3	Yes	No	
4	Yes	Yes	CD-ROM
5	No	No	
6	Edit	No	
7	Yes	No	
8	Yes	Yes	Screen Design
9	Yes	Yes	CD-ROM
10	Yes	Yes	Videodisc, CD-ROM, Hypertext
11	Yes	No	Videodisc, CD-ROM

TABLE 2: STAFF QUALIFICATIONS

	As 1st Priority	As 2nd Priority	As 3rd Priority
Writers			
Good writing skills	6	2	1
Good technical knowledge	2	5	1
Experience	2	1	2
Good attention to detail	1	0	0
Good information organization	0	2	0
Good common sense (thinking)	0	1	1
Enjoyment of the profession	0	0	1
Instructional Designers			
Experience	5	0	0
Good writing skills	0	4	0
Good people skills	0	1	2
Good information organization	0	0	2
Project management skills	0	0	1
Editors			
Good writing skills	3	3	1
Grammar	2	2	0
Good technical knowledge	2	1	0
Good information organization	1	2	0
Experience	1	0	0
Time management	0	1	0
Good people skills	0	0	8
Total Managers Who Volunteered the Qualification			

Writers

Good writing skills	9
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Good technical knowledge	8
Experience	5
Good attention to detail	1
Good information organization	2
Good common sense (thinking)	2
Enjoyment of the profession	1

Instructional Designers

Experience	5
Good writing skills	4
Good people skills	3
Good information organization	2
Project management skills	1

Editors

Good writing skills	7
Grammar	4
Good technical knowledge	3
Good information organization	3
Experience	1
Time management	1
Good people skills	8

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POSTSCRIPT

When this article was written, Stephanie's company, Tec-Ed, was one of the first organizations to develop a model for estimating the resources needed for documentation projects. We used this model to define the scope of projects, and we tracked and compared our working time to the model at key milestones. Our role as external consultants required ongoing cost justification, and we wanted to learn how our experience compared with that of documentation managers in the computer industry, our internal counterparts, and sometime clients.

We anticipated that major corporations would have better tools and procedures for estimating and tracking projects than our small consulting firm. In fact, most of the managers we interviewed believed productivity benchmarks hindered them from producing quality documentation! In the article, we argued that productivity, information is a management tool that can be used to justify more resources or "push back" against unreasonable schedules.

What has changed in the 13 years since this article appeared? The overall work processes used in design and development of documentation are essentially the same, although specific tools and media for publishing have changed dramatically with the growth of personal computing and the Internet. I'm pleased to see more usability testing and other user research guiding documentation programs. And if I were conducting this research now, I'd ask what resources the groups were investing in single sourcing and content-management efforts.

The increasing emphasis on user-centered design and the widespread use of minimalist design for documentation have produced shorter, more focused documentation libraries than the ones listed in our article. There is also more blurring of the distinction between product user interface and documentation, such as on-screen instructions and context-sensitive online help.

A key change is that published guidelines for productivity tracking are now available. However. discussions with colleagues and postings on Internet lists such as STC-MGMTPIC-L indicate that productivity tracking is still underutilized.

In today's demanding economy, with competition for each budgeted dollar, the importance of cost justification and demonstrating ROI has never been greater. The work process and management issues discussed in this article may give 21st-century managers insights and perspectives on the use of productivity benchmarks in their ongoing struggle to create quality documentation with limited resources.

TABLE 3: RELATIONSHIPS WITH OTHER DEPARTMENTS

Group	Engineering/Programming	Marketing
1	Close	Close *
2	Good *	Poor
3	Very Good *	Distant
4	Friendly *	Okay
5	Good	Poor
6	Good	Good
7	Good *	Okay
8	Very Good *	weak
9	Client/vendor type *	None
10	Client/vendor type	Limited to user analysis
11	Good *	Client/vendor type

* Ratings within same organization

TABLE 4: PARTICIPATION IN AND EVALUATION OF FUNCTIONAL SPECIFICATIONS

	Group				
	1	2	3	4	5
Help develop specification	Yes	No	No	No	No
Can suggest improvements					
During spec review	Yes	Yes	No	Yes	No
During writing process	Yes	Yes	Yes	Yes	Yes
Suggestions implemented (%)	50	60	25	80	10
Typical spec changes (%)	50	*	*	*	*

	Group					
	6	7	8	9	10	11
Help develop specification	Yes	No	Yes	No	Yes	Yes
Can suggest improvements						
During spec review	Yes	Yes	Yes	Yes	Yes	Yes
During writing process	Yes	Yes	Yes	Yes	Yes	Yes
Suggestions implemented (%)	50	80	80	50	50	50
Typical spec changes (%)	70	70	50	30	70	40

* Unquantifiable ("a lot")

TABLE 5: TECHNICAL SPECIFICATION FREEZE MILESTONES

	Group				
	1	2	3	4	5
After second draft		X			
Before final review draft	X		X	X	
Before final text production					X
Percent of time successful	75	50	0	20	20

	Group					
	6	7	8	9	10	11
After second draft	X				X	
Before final review draft		X		X		X
Before final text production			X			

Percent of time successful	60	0	0	60	25	0
----------------------------	----	---	---	----	----	---

TABLE 6: GROUP SIZE RATIOS

	Group			
	1	2	3	4
Size of group (all positions)	1,000	5	72	55
Source developers supported	n/a	20	1,500	300
Ratios				
Writer to developer	n/a	1:8	1:25	1:7
Instr designer to developers	n/a	n/a	n/a	1:60
Staff editors to writers	1:90	1:3	n/a	1:11
Staff artist to writers	1:300	1:5	1:10	1:40
Staff text production to writers	1:70	1:3	1:20	1:7
Supervisor to staff	1:10	1:5	1:7	1:10

	Group			
	5	6	7	8
Size of group (all positions)	12	60	65	66
Source developers supported	110	400	300	300
Ratios				
Writer to developer	1:11	n/a	1:10	1:6
Instr designer to developers	1:100	1:9	n/a	1:75
Staff editors to writers	1:10	1:11	1:4	1:11
Staff artist to writers	n/a	n/a	1:10	1:50
Staff text production to writers	n/a	1:21	1:6	1:7
Supervisor to staff	1:10	1:15	1:10	1:11

	Group		
	9	10	11
Size of group (all positions)	19	76	100
Source developers supported	150	900	600
Ratios			
Writer to developer	1:10	1:15	1:7
Instr designer to developers	n/a	n/a	n/a
Staff editors to writers	1:15	1:8	1:7
Staff artist to writers	n/a	1:9	1:8
Staff text production to writers	1:8	1:18	1:10
Supervisor to staff	1:7	1:9	1:7

TABLE 7: DATA ON TYPICAL DOCUMENTS

	Group			
	1	2	3	4
Typical document length (pages)				
User manuals	250	200	100	30
Reference manuals	700	1,000	500	200
Number of review				
Draft cycles before preparation of originals for printing	3	3	4	4

Changes per draft (%)				
First draft	30	40	30	60
Second draft	10	5	20	30
Third draft	n/a	n/a	10	20
Final draft	1	1	2	5
	Group			
	5	6	7	8
Typical document length (pages)				
User manuals	300	300	100	100
Reference manuals	1,000	600	300	800
Number of review Draft cycles before preparation of originals for printing	4	2	2	3
Changes per draft (%)				
First draft	40	50	30	50
Second draft	35	n/a	n/a	25
Third draft	15	n/a	n/a	n/a
Final draft	1	25	1	10
	Group			
	9	10	11	Avg
Typical document length (pages)				
User manuals	250	200	300	194
Reference manuals	600	250	1,000	632
Number of review Draft cycles before preparation of originals for printing	4	3	2	3
Changes per draft (%)				
First draft	40	30	10	37
Second draft	40	15	n/a	23
Third draft	5	n/a	n/a	13
Final draft	1	3	10	5

TABLE 8: ESTIMATING PROCEDURES

	Group				
	1	2	3	4	5
Advance notice (months)	1	8	1	4	6
Estimating approach					
Experience (gut feel)	1	1	1	1	1
Target completion date	2	2	2	2	2
Estimating criteria					
Pages in a manual	X	X	X		
Degree of difficulty				X	
Target completion date	X				X
	Group				

	6	7	8	9	10	11
Advance notice (months)	6	6	18	1	12	6
Estimating approach						
Experience (gut feel)	1	1	1	2	1	1
Target completion date	2	2	2	1	2	2
Estimating criteria						
Pages in a manual	X	X	X	X	X	X
Degree of difficulty		X				X
Target completion date		X	X			

TABLE 9: PRODUCTIVITY MEASURES

	Group				
	1	2	3	4	5
Meet schedule milestones		1	1	1	
Stay within budget					1
Satisfy usability metrics	1				2
Gut feel					

	Group					
	6	7	8	9	10	11
Meet schedule milestones	1		1		2	1
Stay within budget				1		2
Satisfy usability metrics				2	1	
Gut feel		1				

TABLE 10: KEY MANAGEMENT ISSUES

	Group				
	1	2	3	4	5
Quality control	3	2	4	1	3
Meeting the schedule	2	3	6	3	1
Customer satisfaction	5	1	--	2	4
Project management	1	--	2	4	2
Relations with developers	--	--	3	5	5
Staying within budget	4	--	5	6	--
Overworked department	--	--	1	--	--
Reducing manual size	--	--	--	--	--
Staff retention	--	--	--	--	--

	Group					
	6	7	8	9	10	11
Quality control	1	1	2	5	2	1
Meeting the schedule	5	3	3	1	3	4
Customer satisfaction	2	2	1	3	--	2
Project management	3	6	6	--	6	5
Relations with developers	4	5	4	4	--	6
Staying within budget	--	4	5	--	1	3
Overworked department	6	--	--	--	4	--
Reducing manual size	--	--	--	2	--	7
Staff retention	--	--	--	--	5	--

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Intelligent content and technology integration

Tansey, Mike

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Abstract:

Meeting the challenge of content management means selecting the right content, and ensuring that the tools and technologies that accompany it build on the research environment already in place. In the Web world, the first piece of the **digital** library technology puzzle is the links infrastructure. A well-conceived vendor platform is one that allows a researcher to follow an idea wherever it may lead, allowing the underlying linking system to integrate, extend and organize the research environment. The second piece of the **digital** library technology puzzle is the search infrastructure. In today's **digital** research environments, traditional (Boolean) searching is complemented by new relevance-based natural language searching, cross-search technologies and even new portal-level cross-collection discovery tools. The only way to ensure intelligent integration within the research organization is to choose **content** from information companies that offer value-added

linking and searching with the larger **digital** library environment in mind.

?

Text:

To create a unified **digital** library environment, information managers can no longer select database products based purely on content. Instead, they must seek out implementations from leaders who can also offer new technologies for organization, searching and links navigation. Information providers are developing fully integrated solutions, including **links** management systems and non-traditional search technologies. Meeting the challenge of **content** management, therefore, means selecting the right content, and ensuring that the tools and technologies that accompany it build on the research environment already in place.

Linking Gateways

In the Web world, the first piece of the **digital** library technology puzzle is the links infrastructure. Information managers have a daunting task: to ensure that links management within specific vendor platforms offers the best value-added benefits, and that those same vendor platforms work seamlessly with any portal-level, context-sensitive linking system in use by the library.

A well-conceived vendor platform is one that allows a researcher to follow an idea wherever it may lead, allowing the underlying linking system to integrate, extend and organize the research environment. A successful **linking** infrastructure acts "behind the scenes" to ensure that the natural relationships between **content** sources are highlighted for the user. The ISI Web of Knowledge platform is an example of how a **linking** infrastructure can provide those connections.

Interproduct links: Connect a record in one **content** source to the same record in another. By seeing how one article can be found in numerous resources, researchers are able to explore a set of related databases in a targeted way, and to quickly and easily gather the unique information provided in each. A researcher has a variety of ways to explore a topic within an individual database, but with interproduct links the possibilities increase dramatically. The ISI Links infrastructure within ISI Web of Knowledge permits this type of exploration by automatically showing special link buttons whenever a paper appears in two or more platform resources. ISI **Links** manages the connections between **content**-within the context of the institution's subscriptions-so that a researcher doesn't need to.

Shared Citation Links: As serendipity is as much a part of the research process as effort, vendors must find new ways to help researchers along the discovery path. For us, this means using the ISI Links management system to "share" citation information across platform databases. Special buttons have been added to the full record of hosted **content** sources to allow novice users to "stumble" upon the benefits of citation indexing information. Direct **links** to full bibliographies, lists of citing articles and even a "find more like this" feature (called Related Records, formerly only available in Web of Science) are now available within hosted databases such as BIOSIS Previews and INSPEC.1

Full Text Links: For vendor platforms based on bibliographic databases, management of full text links is critical. The role of bibliographic databases is to provide an efficient way to filter an ocean of information down to a pool of relevant articles, papers and patents needed at a given

moment. The next step is to locate the full text of those items--and in a well-designed platform, doing so is a matter of a few mouse clicks.

Here again, the ISI Links management system comes into play within the ISI Web of Knowledge platform, offering full text links via direct publisher feeds and a unique pre-verified algorithmic linking called "RoboLinks." Link resolution is always assured through this stable yet extensible system that has been specifically designed to ensure reliable links to the appropriate copy of an institution's full text.

Context Sensitive Links: A final consideration for the information professional wrestling with the evaluation of a vendor platform is that of links compatibility with the greater library mission. More institutions are realizing the importance of a context-sensitive **link** package, or "**links server**," to a **digital** library. A **links server** offers a way to provide a "menu" of ideas to help researchers decide the best next step in the research process. For example, it can identify which databases index a particular journal, direct a user to all the places where the full text of an article can be found, or to work directly with a document delivery system. The sophistication of links servers range from basic (focusing on relationships between standard electronic resources) to comprehensive (focusing on complete serials management).

To fully support a **digital** library, a vendor platform must be able to seamlessly integrate with an institution's context-sensitive linking package. To this end, the ISI Web of Knowledge platform has been enhanced to offer the integration of OpenURL-based **links** servers. Web of Science is currently OpenURL-enabled, and all **other content** sources within the platform will soon follow suit.

Beyond the Traditional Search

The second piece of the **digital** library technology puzzle is the search infrastructure. Whereas **links** offer the opportunity for **content** relationships to be highlighted, search options offer the researcher a way to use those relationships in a personal, targeted context for precise information retrieval.

A well-developed vendor platform allows different types and levels of searching to meet the needs of different types of research methods. In today's **digital** research environments, traditional (Boolean) searching is complemented by new relevance-based natural language searching, cross-search technologies and even new portal-level cross-collection discovery tools.

Natural Language Searching: With the development of search engines specifically designed to meet the needs of Web-based information, there has been a shift away from the traditional Boolean search paradigm towards a probabilistic model. When retrieving information, a traditional search system manipulates the exact algebraic relationship between the terms entered by the user. In contrast, probabilistic (or "natural language") search systems focus on the concept behind the terms, by weighting each term and then applying relevance to select documents. Natural language searching complements traditional searching. A platform that provides both greatly enhances the research experience.

Within ISI Web of Knowledge, the MuscatDiscovery probabilistic search engine supports two tools: Current Contents eSearch and ISI CrossSearch. In a single search, Current Contents eSearch allows users to retrieve journal articles through a traditional engine and evaluated Web sites (and

individual Web documents) through a probabilistic engine. The researcher enters terms into the Current Contents Connect search interface, which queries them against a set of journals. Current Contents eSearch then transforms the Boolean search into a probabilistic one by adding weighting and relevance criteria. The resultant query is matched against Web sites and Web documents in the Current Web Contents database; relevant hits are returned. Because this second search is completed "behind-the-scenes," the user can uncover valuable Web documents and Web site reviews as a natural extension of a typical journal search.

Cross-Searching: Cross-searching of multiple resources comes into play when there is a need to complement individual database searching (whether traditional or natural language) with a next-level discovery tool.

ISI CrossSearch provides a way of discovering relevant documents-journals, proceedings papers and patents-found in the databases produced by Thomson as well as those hosted within the platform through partnerships with other information producers. A researcher has a choice between conducting a traditional cross-search or a natural language cross-search. For the latter, the easy-to-use "concept" box welcomes users to enter a phrase, sentence, or entire paragraph. This allows the user to approach the research process in a different way, starting with a general idea or concept rather than a specific set of words. The concept CrossSearch is run against the databases chosen by the user, and returns a deduplicated results list sorted by relevance. From there, a researcher decides which individual resource to drill down into by selecting whichever individual database best suits his/her needs.

Federated Searching: Enabling true cross-collection discovery, however, demands even more than a cross-search mechanism. It requires a meta-search mechanism at the portal level, a system referred to as "broadcast," "multi-protocol," "meta-" or "federated" searching.

Federated searching provides a single search interface for all of an organization's electronic resources. Unlike in a cross-search system or a single protocol-based system (such as Z39.50), each database remains in its native format and is not expected to be enabled with a certain query language. Instead, a federated search system houses a set of translators to complete each search-one translator for each database. The system takes the user's search terms, translates the search string into the proper syntax for each electronic resource the user has selected, and then sends each query out separately to the appropriate content source. The federated search system has no search engine of its own-it relies upon the capabilities of the search engines found within the individual databases themselves to retrieve results.

Designed to complement rather than replace the searching within individual databases, this discovery system offers powerful benefits for a **digital** library environment. It allows a content manager to facilitate easy access to an organization's electronic resources-acting as a bridge to lead researchers from the library or organization portal homepage quickly and easily into the electronic resources they need most for their day-to-day information gathering activities. It provides a new tool for both novice and experienced information users in a way that allows a library professional to direct them to the proper resources in an efficient and focused manner. A federated search system also aids e-resource managers by increasing usage of their underutilized resources in order to increase return-on-investment for those content expenditures.

We have chosen to incorporate federated searching in two distinct ways. First, a proprietary federated search infrastructure is a fundamental part of ISI Web of Knowledge. Using the ISI CrossSearch feature as a foundation, a researcher can opt to have a search query automatically translated into

the syntax necessary for two external **content**; sources: PubMed and AGRICOLA. **Other**; free resources in various disciplines will be added in the future, as well as optional subscription-based resources. Second, we have entered into a partnership with WebFeat, Inc., a leader in federated search systems, to offer solutions directly on the library or organization portal.

Future Directions

With the adoption of the OpenURL standard, the information industry has the foundation it needs to improve and extend linking infrastructures in new directions. Information vendors are OpenURL-enabling their products so that a library's context-sensitive **links**; **server**; can be easily integrated with their product offerings.

With the advent of federated searching, portal-level search technology options are about to change dramatically. NISO has already formed a "MetaSearch" standards initiative, and this new type of resource discovery will certainly become an important part of any **digital**; library environment.

The bottom line is that content managers are no longer thinking purely about database content, and information technology specialists are no longer thinking simply in terms of systems. Instead, they are working together to look at the bigger **digital**; library picture, and are taking a comprehensive approach toward the development of electronic resource environments. The only way to ensure intelligent integration within the research organization is to choose **content**; from information companies that offer value-added **linking**; and searching with the larger **digital**; library environment in mind. "With the advent of federated searching, portal-level search technology options are about to change dramatically."

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To create a unified **digital** library environment, information managers can no longer select database products based purely on content. Instead, they must seek out implementations from leaders who can also offer new technologies for organization, searching and links navigation. Information providers are developing fully integrated solutions, including **links** management systems and non-traditional search technologies. Meeting the challenge of **content** management, therefore, means selecting the right content, and ensuring that the tools

and technologies that accompany it build on the research environment already in place.

Linking Gateways

In the Web world, the first piece of the **digital** library technology puzzle is the links infrastructure. Information managers have a daunting task: to ensure that links management within specific vendor platforms offers the best value-added benefits, and that those same vendor platforms work seamlessly with any portal-level, context-sensitive linking system in use by the library.

A well-conceived vendor platform is one that allows a researcher to follow an idea wherever it may lead, allowing the underlying linking system to integrate, extend and organize the research environment. A successful **linking** infrastructure acts "behind the scenes" to ensure that the natural relationships between **content** sources are highlighted for the user. The ISI Web of Knowledge platform is an example of how a **linking** infrastructure can provide those connections.

Interproduct links: Connect a record in one **content** source to the same record in another. By seeing how one article can be found in numerous resources, researchers are able to explore a set of related databases in a targeted way, and to quickly and easily gather the unique information provided in each. A researcher has a variety of ways to explore a topic within an individual database, but with interproduct links the possibilities increase dramatically. The ISI Links infrastructure within ISI Web of Knowledge permits this type of exploration by automatically showing special link buttons whenever a paper appears in two or more platform resources. ISI **Links** manages the connections between **content**--within the context of the institution's subscriptions -- so that a researcher doesn't need to.

Shared Citation Links: As serendipity is as much a part of the research process as effort, vendors must find new ways to help researchers along the discovery path. For us, this means using the ISI Links management system to "share" citation information across platform databases. Special buttons have been added to the full record of hosted **content** sources to allow novice users to "stumble" upon the benefits of citation indexing information. Direct **links** to full bibliographies, lists of citing articles and even a "find more like this" feature (called Related Records, formerly only available in Web of Science) are now available within hosted databases such as BIOSIS Previews and INSPEC. (1)

Full Text Links: For vendor platforms based on bibliographic databases, management of full text links is critical. The role of bibliographic databases is to provide an efficient way to filter an ocean of information down to a pool of relevant articles, papers and patents needed at a given moment. The next step is to locate the full text of those items--and in a well-designed platform, doing so is a matter of a few mouse clicks.

Here again, the ISI Links management system comes into play within the ISI Web of Knowledge platform, offering full text links via direct publisher feeds and a unique pre verified algorithmic linking called RoboLinks." Link resolution is always assured through this stable yet extensible system that has been specifically designed to ensure reliable links to the appropriate copy of an institution's full text.

Context Sensitive Links: A final consideration for the information professional wrestling with the evaluation of a vendor platform is that of links compatibility with the greater library mission. More institutions are realizing the importance of a context-sensitive **link** package, or "**links server**," to a **digital** library. A **links server** offers a way to provide a "menu" of ideas to help researchers decide the best next step in the research process. For example, it can identify which databases index a particular

journal, direct a user to all the places where the full text of an article can be found, or to work directly with a document delivery system. The sophistication of links servers range from basic (focusing on relationships between standard electronic resources) to comprehensive (focusing on complete serials management).

To fully support a **digital** library, a vendor platform must be able to seamlessly integrate with an institution's context-sensitive linking package. To this end, the ISI Web of Knowledge platform has been enhanced to offer the integration of OpenURL-based **links** servers. Web of Science is currently OpenURL-enabled, and all **other content** sources within the platform will soon follow suit.

Beyond the Traditional Search

The second piece of the **digital** library technology puzzle is the search infrastructure. Whereas **links** offer the opportunity for **content** relationships to be highlighted, search options offer the researcher a way to use those relationships in a personal, targeted context for precise information retrieval.

A well-developed vendor platform allows different types and levels of searching to meet the needs of different types of research methods. In today's **digital** research environments, traditional (Boolean) searching is complemented by new relevance-based natural language searching, cross-search technologies and even new portal-level cross-collection discovery tools.

Natural Language Searching: With the development of search engines specifically designed to meet the needs of Web-based information, there has been a shift away from the traditional Boolean search paradigm towards a probabilistic model. When retrieving information, a traditional search system manipulates the exact algebraic relationship between the terms entered by the user. In contrast, probabilistic (or "natural language") search systems focus on the concept behind the terms, by weighting each term and then applying relevance to select documents. Natural language searching complements traditional searching. A platform that provides both greatly enhances the research experience.

Within ISI Web of Knowledge, the MuscatDiscovery probabilistic search engine supports two tools: Current Contents eSearch and ISI CrossSearch. In a single search, Current Contents eSearch allows users to retrieve journal articles through a traditional engine and evaluated Web sites (and individual Web documents) through a probabilistic engine. The researcher enters terms into the Current Contents Connect search interface, which queries them against a set of journals. Current Contents eSearch then transforms the Boolean search into a probabilistic one by adding weighting and relevance criteria. The resultant query is matched against Web sites and Web documents in the Current Web Contents database; relevant hits are returned. Because this second search is completed "behind-the-scenes," the user can uncover valuable Web documents and Web site reviews as a natural extension of a typical journal search.

Cross-Searching: Cross-searching of multiple resources comes into play when there is a need to complement individual database searching (whether traditional or natural language) with a next-level discovery tool.

ISI CrossSearch provides a way of discovering relevant documents--journals, proceedings papers and patents--found in the databases produced by Thomson as well as those hosted within the platform through partnerships with other information producers. A researcher has a choice between conducting a traditional cross-search or a natural language cross-search. For the latter, the easy-to-use "concept" box welcomes users to enter a phrase, sentence, or entire paragraph. This allows the user to approach the research process in a different way, starting with a general idea or concept rather than a specific set of words. The concept CrossSearch is run against the databases chosen by the user, and returns a de-duplicated results list sorted by relevance. From there, a researcher decides which individual resource to drill down into by selecting whichever

individual database best suits his/her needs.

Federated Searching: Enabling true cross-collection discovery, however, demands even more than a cross-search mechanism. It requires a meta-search mechanism at the portal level, a system referred to as "broadcast," "multi-protocol," "meta-" or "federated" searching.

Federated searching provides a single search interface for all of an organization's electronic resources. Unlike in a cross-search system or a single protocol-based system (such as Z39.50), each database remains in its native format and is not expected to be enabled with a certain query language. Instead, a federated search system houses a set of translators to complete each search--one translator for each database. The system takes the user's search terms, translates the search string into the proper syntax for each electronic resource the user has selected, and then sends each query out separately to the appropriate content source. The federated search system has no search engine of its own--it relies upon the capabilities of the search engines found within the individual databases themselves to retrieve results.

Designed to complement rather than replace the searching within individual databases, this discovery system offers powerful benefits for a **digital** library environment. It allows a content manager to facilitate easy access to an organization's electronic resources--acting as a bridge to lead researchers from the library or organization portal homepage quickly and easily into the electronic resources they need most for their day-to-day information gathering activities. It provides a new tool for both novice and experienced information users in a way that allows a library professional to direct them to the proper resources in an efficient and focused manner. A federated search system also aids e-resource managers by increasing usage of their underutilized resources in order to increase return-on-investment for those content expenditures.

We have chosen to incorporate federated searching in two distinct ways. First, a proprietary federated search infrastructure is a fundamental part of ISI Web of Knowledge. Using the ISI CrossSearch feature as a foundation, a researcher can opt to have a search query automatically translated into the syntax necessary for two external **content** sources: PubMed and AGRICOLA. **Other** free resources in various disciplines will be added in the future, as well as optional subscription-based resources. Second, we have entered into a partnership with WebFeat, Inc., a leader in federated search systems, to offer solutions directly on the library or organization portal.

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Copyright: It's implication for electronic information

Rao, Siriginidi Subba

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Abstract:

This paper presents an overview of copyright, its history, and implications for electronic and multimedia. The international treaties on copyright are listed and the status of copyright protection in select countries is covered, including copyright law enactment, term, scope, sanctions, percentage of piracy and revenue loss in software piracy. Copyright issues for e-information, the Internet and library and information centres are discussed. **Digital** copyright protection technologies - ECMS, watermarks, fingerprints and **digital** signatures, etc. - are described. It is concluded that copyright law has not disappeared with the evolution of technology and the development of a globalised IPR regime is recommended. (PUBLICATION ABSTRACT)

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Abstract

This paper presents an overview of copyright, its history, and implications for electronic and multimedia. The international treaties on copyright are listed and the status of copyright protection in select countries is covered, including copyright law enactment, term, scope, sanctions, percentage of piracy and revenue loss in software piracy. Copyright issues for e-information, the Internet and library and information centres are discussed. **Digital** copyright protection technologies - ECMS, watermarks, fingerprints and **digital** signatures, etc. - are described. It is concluded that copyright law has not disappeared with the evolution of technology and the development of a globalised IPR regime is recommended.

Introduction

Copyright provides legal **rights** exclusively given for a definite period to the creators of an intellectual work, e.g. literary works (anything in writing), artistic works (drawings, maps, plans etc.), musical works, films, sound recordings, computer programs (source and object code) for sale or any other use. It is, in principle, not concerned with things that are not perceivable, such as abstract ideas, concepts and the like. Copyright protection begins when works are actually created and fixed in a tangible form. The emerging **digital** technology, increasing use of computers, communication technology and their convergence into an integrated information technology, have given rise to challenging legal issues for copyright and many more are expected in the future. The ease of distribution, altering **digital** information and the proliferation of computer networking, raise concerns about copyright. Copyright was designed for three basic reasons: to reward creators for their original works; to encourage availability of the works to the public; and to facilitate access and use of copyrighted works by the public in certain circumstances.

Overview of copyright: its history, electronic and multimedia versions

Initially, copyright originated with the printing press. The **rights** granted under copyright matched the type of creative work involved, medium of work and realities of market economics. With the emergence of new techniques of recording, fixation and reproduction, the **rights** of reproduction, distribution, modification, display, etc. have been introduced. As computer programs were recognised as a protectable expression, modification to traditional **rights** followed. Many concepts associated with existing **rights** are not easily transferable from paper-based formats to the **digital** world. The few exemptions for exclusive **rights** of a copyright owner are for fair use, first sale doctrine and library use.

Copyright could be classified in terms of items, **rights** and term. The items cover the areas of: original literary, musical, dramatic and artistic work; cinematographic films; sound records and protection of the form but not the ideas. The **rights** cover the classes of: right of reproduction; right of distribution; right of public performance; right of broadcasting; right of adaptation; right of sale, rental and hire and right of translation. The term covers: life plus 50 years to the author of the work and 50 years in case of other works.

History of copyright: a chronology The history of American copyright law originated with the introduction of the printing press to England in 1492. The Licensing Act of 1662 confirmed that monopoly and established a register of licensed books. The Act of 1710 established authors' ownership of copyright and a fixed term of protection of copyrighted works of 14 years, renewable for 14 more, if the author was alive upon its expiry.

In the USA, the Copyright Act of 1790 implemented the copyright provision of the Constitution. The Act granted US authors the right to print, reprint or publish their work for a period of 14 years and to renew for another 14. Major revisions to the Act were implemented in: 1831 (term of protection extended to 28 years with a possibility of a 14-year extension); 1870 (administration of copyright registrations moved from individual district courts to the Library of Congress Copyright Office); 1909 (broadened the scope of categories protected and extended the term of protection to 28 years with a possible renewal for 28); and 1976 (due to technological developments and their impact on what might be copyrighted, how works might be copied and what constituted an infringement needed to be addressed, in anticipation of adherence to the Berne Convention).

The Berne Convention in 1886 provided the basis for mutual recognition of copyright between sovereign nations and promoted the development of international norms in copyright protection. It has been revised five times since then.

In 1891 the International Copyright Treaty was introduced.

In 1976 the New Technological Uses of Copyrighted Works Process was designed in order to understand the amount of photocopying for use in interlibrary loan arrangements permitted under the copyright law.

The USA became a Berne signatory in 1988. The major changes for the US copyright system were greater protection for proprietors and new copyright relationships with member countries.

In 1990 Congress amended the Copyright Act to prohibit commercial lending of computer software. It was a modification of the first sale doctrine.

In 1992 there was an Amendment to Section 304 of Title 17, making copyright renewal automatic.

The National Information Infrastructure (NII) Initiative in 1993 aimed to explore the application and effectiveness of copyright law and the NII.

The 1994 Conference on Fair Use discussed guidelines for fair use in the electronic environment.

In the 1996 Trade-Related Aspects of Intellectual Property **Rights** (TRIPS) Agreement, copyright for works from eligible countries was restored. Database Protection Legislation was introduced to protect databases for 15 years from unauthorised extractions of more than an insubstantial part of the database contents. The World Intellectual Property Organisation (WIPO) agreed to permit application of fair use in the **digital** environment.

In 1998 the Sonny Bono Copyright Term Extension Act extended protection from life of the author plus 50 years to life of the author plus 70 years. The **Digital** Millennium Copyright Act's five titles implemented the WIPO Internet Treaties; established safe harbours for online service providers; permitted temporary copies of programs during computer maintenance; made miscellaneous amendments to the Copyright Act that facilitated Internet broadcasting and created sui generis protection for boat hull designs.

The 1999 Uniform Computer Information Transaction Act was designed to create a unified approach to the licensing of software and information. The **Digital** Theft Deterrence and Copyright Damages Improvement Act provided a significant hike in the minimum statutory damages for various types of copyright infringement.

In 2001 state sovereign immunity was given, so that state entities, including universities and libraries, may not be held liable in federal court cases involving intellectual property laws. The 2002 Consumer Broadband and **Digital** Television Promotion Act requires that any device that can record, receive or store copyrighted **digital** information comply with copy protections encoded in **digital** works such as DVDs, CDs and e-books. The Senate approved distance education legislation: an expansion of the scope of materials that may be used in distance education (Association of Research Libraries, 2002; Little, 2002).

Electronic copyright

There is no real difference between copyright and electronic copyright (or e-copyright). The distinction lies in the way the material has to be decoded or read by the user. Works that are published in electronic format (CDs, online databases, floppy disks, etc.) are protected as their printed equivalents. The users of printed information have allowances for copying and distribution under special fair dealing arrangements. No such privileges exist for electronic information or e-information. E-copyright first came into the public consciousness with the rise and fall of Napster, a peer-to-peer file-sharing service that enabled consumers to illegally distribute **digital** music files. E-copyright refers to the right to copy music, movies, text including Web content, etc. In the USA, copyright conferral is automatic; the instant one completes a manuscript, one holds the copyright. If one does not hold the copyright to something, copying it, posting it on a Web site, making it available for download or including it in an e-mail or bulletin board, results in breaking the law.

Myths and realities about e-copyright The most popular include:

Myth: technology moves so fast that copyright law has not caught up with the Internet yet. Reality: in the USA and many other countries, laws have been in place to protect e-copyright from the conception of the Internet.

Myth: there is no difference between linking to information and copying it on to a Website. Reality: copying information without permission is a copyright violation. **Linking** peripherally, on the other hand, is not.

Myth: it is fine to repurpose **content** if one's enterprise does not stand to profit directly. Reality: copyright law does not permit it were one to profit from it or not.

Myth: if you get caught infringing e-copyrights, all you need to do is take it off the Web server to close the case. Reality: a smart victim will print snapshots of the copied material as a proof, in addition to when, for how long and other incriminating details.

Implications for the enterprise

The consequences of ignoring e-copyright have significant implications for the enterprise. If the content creators are not aware of e-copyright basics, the enterprise intellectual property may be at risk. The Web **content** and **content** distributed via **other** electronic means, such as e-mail and ftp, may be stolen, reproduced, altered, distributed all over the world, without knowledge or consent. Also the enterprise itself may be at risk by infringing others' **rights**, whether through accidental or intentional copyright violation, which is very serious.

Protecting the enterprise

The smart strategies that can help protect data from online copying and the enterprise from potential e-copyright lawsuits include:

Do not let the content creators post anything on the Web site for which prior written permissions are not available. This includes Web **content** from **other** sites, e-mails, attachments and other sources.

Be circumspect about **linking**. Deep **linking**, especially inside a frame, requires permission to access their sites.

Do not put anything on the enterprise site that you would not mind being copied. A copyright notice at the bottom of each page announces the intent to protect your **rights**. It is much cheaper to prevent copying than to chase them after the fact.

Protect sensitive content from public access by deploying passwords, snapshot technology and subscription-only access. This would help to distribute content to a select group, while protecting it from wholesale public access.

Manage bulletin boards and other public access environments. Software companies offer peer-to-peer bulletin boards as a form of technical support; online magazines offer bulletin boards to capture reader feedback. Make sure the corporate policy regarding the content of these public access environments is prominently displayed (Veer, 2003). Multimedia copyrights

In multimedia, different categories of copyright protected works are used. The creation types and corresponding right owners can be classified as:

audio: composers, lyricists and arrangers; music publishers; performing artists and phonogram producers;

still images: visual, graphic artists and photographers;

text: writers; journalists; translators; publishers of books, magazines, journals, periodicals and newspapers;

audiovisual: script, screen and dialogue writers and dramatists; directors; other film authors - scene designers, costume designers, directors of photography and editors; actors; film producers and broadcasters;

others: computer software programmers and publishers; database developers and publishers; video-game developers and publishers and online learning systems developers (Koskinen-Olsson, 1999).

International treaties and status of copyright protection

The World Intellectual Property Organisation (WIPO), a specialised agency of the United Nations, is responsible for administering 23 international treaties that cover various aspects of intellectual property protection. Currently there are 179 member states belonging to WIPO, over 90 per cent of all countries (Ladas & Parry, 1995).

International treaties

The main international treaties relating to copyright protection are as follows.

The Berne Convention (1886) was designed for the protection of literary and artistic works and about 140 countries are signatories. It assists the nationals of its member states with international protection for such works as novels, poems and plays, songs and musicals, paintings, sculpture and architectural works (WIPO, 1979).

The Universal Copyright Convention and protocols 1, 2 and 3 (1952 and last revised 1971) are a lower level copyright convention with 95 member states. Each contracting state undertakes to provide for the adequate, effective protection of the **rights** of authors and other copyright proprietors in literary, scientific and artistic works including writings, musical, dramatic and cinematographic works, paintings, engravings and sculpture (Unesco, 1971).

The Rome Convention (1961) for the Protection of Performers, Producers of Phonograms and Broadcasting Organisations has 69 member states (WIPO, 1961).

The Geneva Convention (1971) for the Protection of Producers of Phonograms against Unauthorised Duplication of Their Phonograms has 68 member states (WIPO, 1971).

The General Agreement on Tariffs and Trade/World Trade Organisation's (1995) TRIPS Agreement applies to 135 WTO members and came into effect in 1995 for developed countries. Intellectual property obligations came into effect for developing countries on 1 January 2000 and will apply from 1 January 2005 for least-developed countries. The TRIPS agreement requires all members to comply with the substantive provisions of the Berne Convention. It mirrors the Rome Convention protections against unauthorised copying of sound recordings and provides a specific right to authorise or prohibit commercial rental of these works. It also provides a detailed set of requirements relating to the enforcement of **rights** (World Trade Organisation, 1994).

WIPO's three treaties (WIPO, 1996a, b, 1997) are as follows:

(1) The Copyright Treaty complements the Berne Convention. It covers computer programs in any modes or forms of expression that are protected as literary works. The most important article concerns the **rights** of communication to the public. This covers the online **digital** delivery of works and functions as a basic rule for **digital** department stores, **digital** bookstores, **digital** record and video shops. Authors' **rights** include providing access to protected works. Contracting parties or member countries of the Treaty can fulfil the requirements by granting authors a right of communication, transmission or distribution by transmission.

(2) The Performers and Producers of Phonograms Treaty was intended to cover all relevant aspects of protection of performers and producers of phonograms. The definitions have been modernised to keep pace with technology. The definition of broadcasting now explicitly covers transmission by satellite and encrypted signals. The performers and the makers of phonograms have been granted the right of reproduction, both direct and indirect, in any manner or form and an exclusive right to make their phonogram-based performances publicly available via interactive on-demand delivery methods.

(3) The Databases Treaty is a new instrument for sui generis protection of databases. It is intended to extend to any database if collection, verification or other steps in its production involve substantial investment in the form of human or financial resources. The idea is to consider databases as vital elements of a global infrastructure, to encourage development of databases and commercialisation. The reservation by scientific communities, government departments and **other** institutions handling large volumes of **data** was that protection would break the principle of full and open exchanging of scientific and **other** databases of **data**.

Status of copyright protection

Table I provides the status of copyright protection in select countries covering copyright law enactment, term, scope, sanctions, percentage of piracy and revenue loss in software piracy. The piracy rate in the world has increased in two consecutive years, 2000 (37 per cent) and 2001 (40 per cent) (TradePort, 2000; BSA, 2002).

Copyright issues

E-information

E-information is information that has been converted into electronic form for the purposes of being carried or transmitted on **digital** media. It can be stored, manipulated, displayed on computer and transmitted over the Internet. It also includes information that is always intended to function electronically, such as computer software (source and object code). Copyright has a role in three areas of e-information: computer software, databases (collections of information held on computer, often put together using specialised computer programs) and communication of e-information (transmission over networks) (Wienand, 1998).

Computer programs

Copyright treats a computer program as a literary work. A software product in the wider sense is distinct from the program code that runs on a computer and may be made up of a number of different copyright works.

Examples include a user manual, packaging artwork, diagrams and plans used to produce screen displays, sounds and sound recordings, moving images, etc. The creator of the program, the programmer, is in principle the owner, unless the programmer is an employee and created the program as part of his or her job, in which case the copyright in the program belongs automatically to the employer, or the programmer is not an employee, but has assigned the copyright to someone else, under a programming agreement. Copyright makes a range of actions infringements unless authorised, such as copying (identical copy of whole or substantial part of a program), issuing (copies to public), rental and lending, adaptation (an altered version or a translation of it into a different computer language), authorising (requesting someone else to do any of the previous acts) and secondary infringements (having knowledge before committing).

Databases

A database is a collection of independent works, **data** or **other** materials that are arranged in a systematic or methodical way and individually accessible by electronic or other means. Examples include telephone and street directories, customer mailing lists and electronic collections of reports, works of art, photographs or musical works. The technological advances of the last ten years have increased the use and value of databases enormously and highlighted the importance of protecting them from unauthorised copying. Until 1998, copyright existed in databases as literary works by virtue of the selection and arrangement in the compilation of the data. Copyright in the compilation meant that reproducing a large number of entries from a database would infringe the copyright in the database, thus giving the database owner a framework of legal protection on which to rely in exploiting their databases as business assets – a form of protection complemented by such practical measures as seeding databases with false entries and encryption techniques. According to the 1996 EU Directive, databases that are not intellectual creations but nevertheless represent a substantial investment in obtaining, verifying or presenting the contents should be protected by a new database right, allowing the owner to prevent the unauthorised extraction or re-utilisation

of all or a substantial part of the database. Database right is different from copyright in that it does not protect works, but it protects the content of a database. The USA has no copyright protection to non-original databases and does not have any equivalent to database right. Practical implications of copyright on e-works The copyright owner of an e-work normally imposes the following kind of authorisation on its use: one may acquire and retain a single copy for personal use only and the following kinds of use are normally explicitly prohibited:

copying or reproduction (downloading a document, printing it and then making multiple photocopies, making copies of the document computer file);

Table I

distribution (downloading a document and sending it as an e-mail attachment to one or more other individuals);

republishing (placing a document protected by e-copyright on a personal or commercial Web server for others to access); and

selling (selling a copy of an e-work). In the case of commercially published e-information, such authorisations and restrictions on use are normally defined in a licence or service agreement document.

The Internet

Digital technology enables data to be copied without defect, manipulated, sliced and re-edited with great freedom and is a perfect technology for pirates. All these technical possibilities pose problems for copyright law in developing suitable techniques for catching up with the infringements. For example, viewing of a Web site means that a copy is downloaded into the viewer's random access memory, so an infringement of the copyright in the site will occur, unless such viewing is permitted (**under** an implied **licence**); and forwarding an e-mail involves copying the e-mail that would infringe the sender's copyright, unless permission to forward was granted or implied (Wienand, 1998). The information available on the Internet has the same copyright protection as if it were a magazine, publication, printed book, broadcast, etc.

The great myth is that the Internet is free for all in using vast available resources. In the public domain, material found on the Internet may be copied freely only if the information is created by the federal government or the copyright has expired or been abandoned by the holder. Any work published on the Internet is not automatically placed in the public domain. Material provided by others and used with permission, e.g. musical instrument **digital** interfaces (MIDIs), graphic images including Web graphics, photos, logos, **digital** art, writings, text, HTML, Java scripts or other material that people are given permission to use or display on Web sites, does not entitle anyone to claim copyright to the material in question. Graphic images provided by free or link ware graphics sites are not in the public domain. These images are not given in ownership but could be used, if they comply with the owner's terms and conditions. Fonts and dingbats, created point by point, drawn from scratch or through similar means, are copyrighted by the author. Scanned designs converted into fonts and dingbats or reduplication/ re-fabrication/alteration of existing ones are not original designs and do not entitle the individual to claim ownership. Hot-linking or linking directly to another Web site's images and/or spider-harvesting (robots programmed to index pages and pull images on to another server) is an unauthorised derivative work and constitutes a violation of the real owner's copyright. The use of frames to ease navigation within a site is acceptable. However, it is not acceptable to lock or trap other Web sites or pages in frames.

Data transmission

The Internet is less of a system for transmitting data than a system for allowing it to be retrieved and there is no doubt that transmissions occur. Making a work available to a large audience via a Web page or a Network server is not necessarily treated as a separate infringement, akin to issuing copies of a work to the public. There are several possible answers: authorising someone to commit an infringement is an infringement in itself. So, putting material on to a server may well be tantamount to authorising those who can access it to copy it. This has severe implications for Internet service providers.

Under UK law, it is an infringement of copyright to transmit a work by means of a telecommunications system, knowing or having reason to believe that infringing copies will be made by means of reception of that transmission and certain Internet transmissions can be fitted into the definition of cable programs.

Academic Web and software developers The Internet was originally designed to distribute and share information because research and development organisations felt that it would accelerate and enhance their ability to solve important problems to reach national, academic and business goals. Concerns about copyright litigation continue to threaten the free exchange of ideas. The requirements for faculty, staff and students to develop a Web site include: getting permission to use commercially produced images and text in course syllabuses; protecting own original images and logos; linking to others' sites to enhance the value of the Web site; Web searches and site printouts for limited use and software development and publishing agreements, including bundling products with one another's, co-development with faculty and commercial publishers, not as specific instructional modules, but of programming code, a courseware shell and offering significant coursework over the Internet. Effective copyright practice for academic software development and electronic publishing must: ensure timely publication of research at Web sites regarded as reliable sources of authoritative information; ensure timely access to information by students, researchers and new product developers;

encourage propagation of information through links and citations;

discourage unlicensed appropriation of others' work or misrepresentation of ownership of that work;

enable academically developed software to reach a broad, world-wide market to catch the competitive edge, recoup the institution's investment and contribute to reputation; and

assure fair and adequate compensation for personnel who contribute special expertise to the creation of new information products (Deden, 1996).

To enforce copyright on the Internet, technology can only be relied on to a certain extent. Many groups are working on methods of identifying or preventing unauthorised electronic copying, by means of encryption, search engines/spiders, watermarking, access controls, protocols, etc.

Library and information centres

Library and information centres (LICs) are the only institutions that attempt to provide a view of the whole of our society's information resources without bias. **Digital** technology:

promises the first realistic long-term solution to the extraordinary expense of shelf space and fast reference;

provides what is essentially a matter transmitter for documents and enables one to stop making irrational decisions about what goes into LIC collections based on the fragility or heft or theft-potential of particular hard copies; and

promises all sorts of new ways to enable LICs to serve their traditional functions as guardian and provider of society's information resources, by way of virtual card catalogues and powerful search engines (Litman, 1996).

Copyright law was originally drafted in a world where intellectual property was always embodied in a physical form (book or journal). In the **digital** age it has moved from a physical object held by a LIC to e-information that is accessed remotely. This is a big change in the position within LICs information food chain. There was a line from the creator to the publisher to the LICs and finally to the public, as the LICs are the public interface on all information and guarantees of public access. The new model goes from the creator to the publisher and to the public, wherein the publisher provides the interface to the electronic documents. The status of LICs is reduced to a pass-through point for someone else's information for organisation and control (Coyle, 1995).

Lending materials

LICs lend materials by the First Sale Doctrine. They make copies of print materials for other LIC patrons (interlibrary loan), for their own patrons (research and reserve copies) and for archival purposes (preservation and replacement). The publishing and entertainment industries favour the proposition that the distribution right LICs enjoy for print works should not exist for e-works, because electronic distribution requires that a copy be made. That copy must be authorised somewhere else in the law or by the owner before it can be distributed.

For licensed works, depending on authorisation to distribute may not pose a problem in many cases, since most **digital** works are licenced and permission to distribute such works is addressed in a license agreement.

Licence agreements vary, but most will address copyright issues in some way or another. Many licences:

- permit limited access only to registered students, faculty and staff or from a particular machine or machines or in a particular place or from a particular domain name or names;
- do not allow the LIC to keep a copy of the works when the licence is terminated or expires;

- attempt to limit users' copies and transmissions of the works; and permit multiple-institution access at a higher price.

LICs have the right to distribute works acquired digitally pursuant to contracts, to create but not to distribute **digital** archival and replacement copies (UT System, 2003).

Copyright owners are rightly concerned about copyright in machine-readable records due to ease, low cost and difficulty in policing of copying materials in machine-readable form such as downloading or electrocopying and high quality of the resulting electronic copies.

If these issues can be addressed to everyone's satisfaction, the proposed electronic or virtual LIC becomes a reality and technically possible. If, however, there is no agreement, then there is an increased chance of alienation between LICs/users and publishers, of LIC users flouting or

ignoring the law or of information users bypassing the publishers altogether and obtaining information directly from authors through bulletin boards. This will not be in the interests of publishers, LICs or users. These issues can be resolved with the aid of Electronic Copyright Management Systems (ECMS) (Oppenheim, 1996).

Digital copyright protection technologies

Printed material has certain advantages over e-information with respect to copyright due to its permanence and authentication. It is easy to ascertain its ownership and facilitates identification of piracy or plagiarism. In comparison, e-information is not so permanent, and it is easy to revise and modify without leaving any resemblance to the original. Some projects/technologies for providing copyright protection to **digital** information resources are described below.

Electronic copyright management systems (ECMS)

Publishers have difficulty in agreeing to any licence for the distribution in electronic form of material for which they hold the copyright. This is due to concerns that the material will be copied and/or re-disseminated in an unauthorised manner and publishers will lose sales, and that material will be amended and then passed off as new material. It would be difficult to demonstrate that the material had originated from the material to which the publisher owned **rights**. Such copying and amendment are, if carried out without the permission of the copyright owner, potentially copyright infringement, and if carried out without the author's permission, are potentially an infringement of the moral **rights** of the original authors. There is a clear need for the development of robust, reliable, economic and tamper-proof mechanisms to identify or tag copyright material and/or to control the usage of such material.

An ECMS can address these issues and is available in two types. The first type is software incorporated into word-processing, computer typesetting, desktop publishing software and document image-processing equipment. This would automatically tag the document in a tamper-proof fashion. This could be read by anyone to identify the original author and/or copyright owner of the material and to identify who had made any amendments to the document. An audit trail would thus be clearly identified. The second type is software used solely to govern or control distribution of the work that may be in printed or electronic form. This can be used to limit what can be done with the original or a copy of the file containing the work. It can limit the use of the file to view only, and the number of times the work can be retrieved, opened, duplicated or printed. The systems will also provide copyright management information to inform the user about authorship, copyright ownership, date of creation or last modification, terms and conditions of authorised uses. Once this type of information is affiliated with a particular work, users will be able to easily address questions over licensing and use of the work (Oppenheim, 1996).

Examples of ECMS

There are a number of working ECMS in operation today. Copyright Clearance Centre (CCC) in the USA offers an ECMS available on the Web that allows **rights** owners to set their prices, establish acceptable uses and view their accounts directly. CCC also offers online licensing of specific titles for reuse, republication of text and non-text portions of printed works, whether on paper or electronically. CCC has an interface with the UK Copyright Licensing Agency's Rapid Clearance Service and the Australian Copyright Agency Limited's Copyright Xpress, some of them off-line. Together with the American Society of Media Photographers, CCC has developed the Media Image Resource Alliance, an online **digital** -stock agency. Users can browse, download and clear **rights** to

use professional-quality images. The Authors' Licensing and Collecting Society in the UK has developed an ECMS solution for online syndication of newspaper and other articles (Koskinen-Olsson, 1999).

Watermarks, fingerprints and **digital** signatures

Watermarking is a technique for embedding hidden data that attaches copyright protection information to a **digital** object. This provides an indication of ownership of the object and possibly other information that conveys conditions of use.

Fingerprinting is a type of watermark that identifies the recipient of a **digital** object as well as its owner, in the form of a serial number assigned by the vendor to a given purchaser. This is intended to act as a deterrent to illegal redistribution by enabling the owner of the data object to identify the original buyer of the redistributed copy. Watermarks and fingerprints are closely related to data-hiding technology, i.e. steganography.

Digital signatures are a mechanism employed in Public-Key Cryptography Standards that enables the originator of an information object to generate a signature by encipherment (using a private key) of a compressed string derived from the object. The **digital** signature provides a recipient with proof of the authenticity of the object's originator. It supports content confidentiality, integrity service and cryptography (Shaw, 1998). Some watermarking software and services are listed below:

Alpha-Tec (www.alphatecltd.com/) for copyright protection and infringement tracking. Solutions for images (EIKONAMark), sound (AudioMark) and video (VideoMark).

Cognicity (www.cognicity.com/) provides data-embedding solutions across audio, video and image (all rich media data types) for applications as broadcast monitoring, Internet protocol/copyright protection and Internet promotion.

Giovanni (www.bluespike.com/giovanni/giovanni.html) offers both image and audio watermarking technology, combining a secure key architecture with an embedded signalling algorithm.

Digmarc (www.digmarc.com/) provides software and plugi-ns for document verification, copyright protection, embedded messages and more.

StirMark (www.cl.cam.ac.uk/~fapp2/watermarking/image_watermarking/stirmark/) is a freely available generic tool for simple robustness testing of image-- watermarking algorithms and related techniques.

Signum Technologies' (www.signumtech.com) SureSign and Veridata systems allow **digital** fingerprints to be embedded into graphic, audio and video **digital** data files, carrying information relating to ownership, validity and revision status.

SysCoP (www.mediasec.com/products/index.html) provides multiple services including marking software for various media types, partial encryption, Internet tracking and searching of watermarked objects.

Verance **Digital** (www.verance.com/digital/index.html) provides high-end **digital** media copy protection for DVD Audio copy control and Secure **Digital** Music Initiative.

ContentGuard's **DRM** (www.contentguard.com/) offers a

comprehensive software system to protect and manage e-books, documents, **music**, software and **other** valuable **content** that is distributed over the Web.

Digital Object Identifier (DOI) (www.doi.org) is an important emerging international standard for identification of published material online. It forms the foundation layer of a set of technologies that enable commerce in published material on the Internet as copyright management systems ordering and fulfilment, tracking, billing and payment schemes, bibliographic control and enforcement systems.

Framework for copyright protection and public access to e-information

As technology continues to evolve, policy-makers experience ongoing uncertainty and frustration with the copyright issues. The focus should be on the underlying issues that influence market behaviour, such as consumer attitudes regarding **digital** information and new opportunities to generate, distribute and profit from it (National Research Council, 2000).

Re-evaluation of publication

The information infrastructure has changed the meaning of publishing. In the physical world, publication has three important characteristics: it is public, irrevocable and provides a fixed copy of the work. In the **digital** world, none of these may be true. The software can be designed to restrict public access to **digital** information and old information is routinely overwritten with new. This distinction matters as a basic element of intellectual property policy and knowing whether a work is published has significant legal consequences for those who distribute it. Re-examination of first sale

The initial sale of a copy of a work exhausts the copyright owner's right to control further distribution. In the **digital** environment, due to the pervasive reach of electronic networks, a single copy of a work available from a **digital** library could diminish the market for the work much more than if it were distributed only in hard copy. Maintaining the limited degree of access to published materials that was established for hard-copy versions of information must continue in the **digital** environment.

Managing access

Information providers are using licensing provisions and technical protection services to manage access. Licensing is commonly used to provide access to some types of **digital** information such as software, research journals and scientific databases. Access expires after a pre-determined length of time and is important to mass-market licences such as shrink-wrap licences for software and other products that offer no opportunity to negotiate terms. Licences are contracts and thus are under no obligation to include the important elements of public policy found in copyright law, such as fair use. The technical protection services offer the owners of **digital** information some assurance that distributing a single copy of a **digital** work does not result in uncontrollable dissemination, by making it difficult for consumers to save or print it. This results in adverse effects on accessing and preserving our permanent social and cultural heritage, since digitised material could easily be withdrawn from circulation.

Fair use

With the increasing use of **digital** information, consumers need a better understanding of the basic principles of copyright law. The music

industry had to implement new ways of doing business to address copyright violations that occur when copyrighted music from compact discs is converted to MP3 format and widely distributed on the Internet. Of particular concern is the extent to which copying for private use can be justified without violating the law. Legal, economic and public policy research should help determine the extent to which fair use and other exceptions and limitations to copyright should apply in the **digital** environment.

Business models

The rapidly evolving Web is an effective environment in which to experiment with business models for marketing, selling, distributing products and services electronically. Choosing an appropriate model that is easy to use may encourage consumers to pay a fair price for the service, rather than looking at other, more cumbersome and technologically complex or legally burdensome ways to obtain that service.

Digital archives

Little progress has been made in archiving **digital** information to preserve the nation's cultural heritage and record intellectual discourse. Significant economic, legal and technical issues must be resolved if archives and libraries are to act as repositories of **digital** information.

Copy in copyright

Current copyright laws address concerns surrounding the copying of texts without the publisher's or author's consent. But, with **digital** information, accessing data means duplicating them. When viewing a Web page, information is automatically downloaded from one computer to another. As a result, many legal copies are now routinely made and it is becoming more difficult to apply existing copyright laws effectively. In addition, because copying is directly related to the way computers function, control of copying would provide powers that go beyond those intended by copyright law.

Conclusion

Copyright law has not disappeared with the evolution of technology. Today, the pace of **digital** technologies, associated convergence and push in terms of their application gaining influence on e-information is taking place at an unprecedented speed. The current notions about copyright have to be modified to suit the electronic environment. Novel business models and new technologies to protect intellectual property, as well as education in copyright law, are all likely to be far more effective mechanisms than major legislative changes for protecting e-information.

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1. INTRODUCTION

The Department of Health and Human Services (HHS or Department) has modified the Standards for Privacy of Individually Identifiable Health

Information (the Privacy Rule), which implement the privacy requirements of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) in a final rule appearing in the Federal Register on August 14, 2002 (the Final Rule). While the final modifications to the federal health privacy rules under HIPAA do not substantially alter the proposed rules issued by the Bush Administration in March 2002 (the Proposed Rules), myths nonetheless flew around the airwaves and presses the next day. Some of the most responsible media reported, inaccurately, that the Bush rule "guts" the Clinton rule; that patients have "lost" federal privacy **rights**; that drug companies are now free to buy patient lists and "direct market" to patients to get them to switch to their drugs; and that the exceptions have virtually swallowed the rule.

Even where the reporting was not inaccurate, it was often inexcusably incomplete. For example, perhaps the most widely reported "angle" on the final privacy rule was that it will force patients to forfeit substantial privacy **rights** because the Bush Administration withdrew Clinton Administration patient "consent" requirements. Every one of these stories omitted the fact that the original Clinton HIPAA privacy rule did not require consents either; that more widely applicable and far more protective "authorizations" are still required in most cases; that the exceptions to authorizations do not go beyond those traditionally applied in the health care industry and under state law; and that health plans and providers still must notify patients of the numerous avenues in the rule for restricting the disclosure of their protected health information, and of their **rights** to correct and amend their medical records.

In truth, after seven years and two Administrations, the final privacy rules are a remarkable political compromise that elegantly balance uniquely American privacy dogma against uniquely American healthcare quality and technology; patient protections against administrative workability; state against federal power; private **rights** against government authority; and individualism against community. Rather than blasting the rules and the bureaucrats for their inadequacies, the media should recognize that these regulators, on both sides of the aisle, have done what Congress itself could not do after 20 years of political debate.

2. THE PRIVACY RULE'S IMPACT ON EMPLOYERS AND ERISA PLANS

In the Final Rule, HHS has stated emphatically that "the Privacy Rule does not apply to employers, nor does it apply to the employment functions of covered entities, that is, when they are acting in their role as employers." HHS recognizes that some employers obtain a great deal of health information about employees when carrying out routine employment functions relating to hiring, compliance with the Occupational Safety and Health Administration (OSHA) requirements, Family Medical Leave Act (FMLA), and other regulations and activities.

The Privacy Rule now contains a revised definition of "Protected Health Information" (PHI). PHI now does not include "(e)mployment records held by a covered entity in its role as employer." HHS, in response to comments received on the proposed revisions, elected not to specifically define "employment records." HHS noted, however, that these records would include information an employer would need to carry out its obligations related to the FMLA, sick leave requests, drug screening, workplace medical surveillance, fitness-for-duty exams, and other similar programs and activities.

The Final Rule also provides clarification regarding employers as "hybrid entities." A covered entity may elect to operate as a hybrid entity, but would not have to do so if its only non-covered functions were those relating to its status as an employer, because employment records are explicitly exempted from the definition of PHI. HHS also stated that an employer is not a hybrid entity merely because it has a self-funded health plan.

Several comments regarding the Proposed Rules dealt with workers compensation programs. There was concern that the "minimum necessary"

standard would prevent insurers, employers, and state administrators from getting the information required to pay claims. HHS stated, however, that the Privacy Rule is not intended to interfere with existing state workers' compensation systems. The preamble to the Final Rule also states that the minimum necessary standard allows covered entities to disclose any PHI that is reasonably necessary for workers' compensation purposes and is intended to allow PHI to be shared for those purposes "to the full extent permitted by (s)tate or other law."

The Final Rule simplifies many of the compliance requirements for fully insured group health plans. In fact, these plans are exempt from many of the Privacy Rule requirements as long as the only PHI held by the plan is summary information and/or information about enrollment and disenrollment, which is considered to be PHI.

The recent changes also simplify certain compliance requirements for self-insured plans. For example, HHS clarified that, if the Privacy Rule allows a covered entity to share PHI with another covered entity, then the covered entity is permitted to disclose PHI to a business associate of the other covered entity. Additionally, an HMO may disclose PHI to a group health plan or a third-party administrator acting as a business associate of the plan because the HMO and the group health plan are operating as an organized health care arrangement as defined in the Privacy Rule.

3. CONSENTS AND AUTHORIZATIONS

Consent. Citing concerns and numerous comments to the effect that requiring covered entities to obtain written consent prior to using PHI for treatment, payment and healthcare operations purposes would have unintended consequences that would compromise the quality and timelines of healthcare delivery, HHS adopted its proposal in the Proposed Rules to eliminate the consent requirement of (section) 164.506. Under the Final Rule, all covered entities now have regulatory authority to use and disclose PHI for treatment, payment and healthcare operations without obtaining the individual's consent.

The preamble to the final regulation states that HHS considered a number of options in response to comments to the Proposed Rules, but chose to eliminate the consent requirement because it was the only change that provided a "global fix" to what HHS and many commentators considered to be the operational problems and unintended treatment consequences associated with consent. HHS addressed the concerns of those commentators who wanted to retain or strengthen the consent rules by reference to a California health information privacy law that does not require consent and that in other respects is very similar to the Final Rule. HHS cited survey results showing that, despite the California law that permitted disclosures of health information without an individual's consent, consumers in California did not have greater concerns about confidentiality than other health care consumers.

Other **rights** provided by the Final Rule are not affected by the elimination of the consent requirement. Although covered entities will not be required to obtain an individual's consent, any uses or disclosures of protected health information for treatment, payment or health care operations must still be consistent with the covered entity's notice of privacy practices. Also, the removal of the consent requirement applies only to consent for treatment, payment and health care operations; it does not alter the requirement to obtain an **authorization under** (section) 164.508 for uses and disclosures of protected health information not otherwise permitted by the Privacy Rule or any other requirements for the use or disclosure of protected health information. Furthermore, individuals retain the right to request restrictions, in accordance with (section) 164.522(a). This allows individuals and covered entities to enter into agreements to restrict uses and disclosures of protected health information for treatment, payment and health care operations that are enforceable under the Privacy Rule.

Although consent for use and disclosure of protected health information for treatment, payment and health care operations is no longer

mandated, this Final Rule allows covered entities to have a consent process if they wish to do so. Covered entities that choose to obtain consent may rely on industry practices to design a voluntary consent process that works best for their practice area and consumers, but they are not required to do so.

The Final Rule effectuates the aforementioned changes in the same manner as in the Proposed Rules. The consent provisions in (section)164.506 are replaced with a new provision at (section)164.506(a) that provides regulatory permission for covered entities to use or disclose protected health information for treatment, payment and health care operations. A new provision is added at (section)164.506(b) that permits covered entities to obtain consent if they choose to, and makes clear any such consent process does not override or alter the authorization requirements in (section)164.508. Section 164.506(b) includes a small change from the proposed version to make it clearer that authorizations are still required by referring directly to **authorizations under** (section)164.508.

Additionally, the Final Rule includes a number of conforming modifications, identical to those in the Proposed Rules, to accommodate the new approach. The most substantive corresponding changes are at (section)(section)164.502 and 164.532. Section 164.502(a)(1) provides a list of the permissible uses and disclosures of protected health information, and refers to the corresponding section of the Privacy Rule for the detailed requirements. The provisions at (section)(section)164.502(a)(1)(ii) and (iii) that address uses and disclosures of protected health information for treatment, payment and health care operations are collapsed into a single provision, and the language is modified to eliminate the consent requirement.

The references in (section)164.532 to (section)164.506 and to consent, authorization or other express legal permission obtained for uses and disclosures of protected health information for treatment, payment and health care operations prior to the compliance date of the Privacy Rule were deleted. The proposal to permit a covered entity to use or disclose protected health information for these purposes without consent or authorization applies to any protected health information held by a covered entity whether created or received before or after the compliance date. Therefore, transition provisions are not necessary.

In the Final Rule, the Department also adopts its proposal to allow covered entities to disclose PHI for the treatment, payment and certain health care operations purposes of another entity. Specifically, the Final Rule at (section)164.506(c):

States that a covered entity may use or disclose protected health information for its own treatment, payment or health care operations.

Clarifies that a covered entity may use or disclose protected health information for the treatment activities of any health care provider.

Permits a covered entity to disclose protected health information to another covered entity or any health care provider for the payment activities of the entity that receives the information.

Permits a covered entity to disclose protected health information only to another covered entity for the health care operations activities of the entity that receives the information, if each entity either has or had a relationship with the individual who is the subject of the information, the protected health information pertains to such relationship, and the disclosure is:

- For a purpose listed in paragraphs (1) or (2) of the definition of health care operations, which includes quality assessment and improvement activities, population-based activities relating to improving health or reducing health care costs, case management and care coordination, conducting training programs, and accreditation, licensing, or credentialing activities; or

- For the purpose of health care fraud and abuse detection or compliance.

Clarifies that a covered entity that participates in an organized health care arrangement may disclose protected health information about an individual to another covered entity that participates in the organized health care arrangement for any health care operations activities of the organized health care arrangement.

Authorization. The Privacy Rule required individual authorization for uses and disclosures of protected health information for purposes that are not otherwise permitted or required under the Privacy Rule. The Privacy Rule prohibited, with limited exceptions, covered entities from conditioning treatment, payment, or eligibility for benefits or enrollment in a health plan, on obtaining an authorization. The Privacy Rule also permitted, with limited exceptions, individuals to revoke an authorization at any time. Additionally, the Privacy Rule sets out core elements that must be included in any authorization. These elements are intended to provide individuals with the information they need to make an informed decision about giving their authorization. This information includes specific details about the use or disclosure, and provided the individual fair notice about his or her **rights** with respect to the authorization and the potential for the information to be redisclosed. Additionally, the authorization must be written in plain language so individuals can read and understand its contents. The Privacy Rule required that authorizations provide individuals with additional information for specific circumstances under the following three sets of implementation specifications: In (section)164.508(d), for authorizations requested by a covered entity for its own uses and disclosures; in (section)164.508(e), for authorizations requested by a covered entity for another entity to disclose protected health information to the covered entity requesting the authorization to carry out treatment, payment or health care operations; and in (section)164.508(f), for authorizations requested by a covered entity for research that includes treatment of the individual.

To address complaints that the authorization requirements of the prior final rule were too complicated and confusing, the Department proposed in the Proposed Rules and adopted in the Final Rule changes to simplify the authorization provisions by consolidating the implementation specifications into a single set of criteria under (section)164.508(c), thus eliminating paragraphs (d), (e) and (f), which contained the separate implementation specifications. Under the Final Rule, paragraph (c)(1) requires all authorizations to contain the following core elements:

- a description of the information to be used or disclosed
- the identification of the persons or class of persons authorized to make the use or disclosure of the protected health information
- the identification of the persons or class of persons to whom the covered entity is authorized to make the use or disclosure
- a description of each purpose of the use or disclosure
- an expiration date or event
- the individual's signature and date, and
- if signed by a personal representative, a description of his or her authority to act for the individual

The Proposed Rules, and now the Final Rule require, at (section)164.508(c)(2), that authorizations contain the following notifications:

- a statement that the individual may revoke the authorization in writing, and either a statement regarding the right to revoke and instructions on how to exercise such right or, to the extent this information is included in the covered entity's notice, a reference to the notice

- a statement that treatment, payment, enrollment or eligibility for benefits may not be conditioned on obtaining the authorization if such conditioning is prohibited by the Privacy Rule, or, if conditioning is permitted by the Privacy Rule a statement about the consequences of refusing to sign the authorization, and

- a statement about the potential for the protected health information

to be redisclosed by the recipient.

Covered entities also will be required to obtain an authorization to use or disclose protected health information for marketing purposes, and to disclose in such authorizations any direct or indirect remuneration the covered entity would receive from a third party as a result of obtaining or disclosing the protected health information.

The Final Rule incorporates a new exception to the revocation provision at (section)164.508(b)(5)(ii) for authorizations obtained as a condition of obtaining insurance coverage when other law gives the insurer the right to contest the policy. Additionally, the Final Rule deletes the exception to permit conditioning payment of a claim on obtaining an authorization be deleted, since the proposed provision to permit the sharing of protected health information for the payment activities of another covered entity or a health care provider would eliminate the need for an authorization in such situations. Finally, the Final Rule incorporates a modification at (section)164.508(a)(2)(i)(A), (B) and (C), to clarify that the permission to share protected health information for the treatment, payment or health care operations of another entity would not apply to psychotherapy notes.

Research Authorizations. The modifications to the authorization requirements eliminated the additional authorization requirements for the use and disclosure of protected health information created for research that includes treatment of the individual. Consistent with this change, the Final Rule further modifies the requirements prohibiting the conditioning of authorizations at (section)164.508(b)(4)(i) to remove the reference to (section)164.508(f). In addition, the Privacy Rule permits an authorization for the use or disclosure of protected health information to be combined with any other legal permission related to the research study, including another authorization or consent to participate in the study. Finally, the Privacy Rule explicitly requires that the statement of the end of a research study or similar language be sufficient to meet the requirement for an expiration date in (section)164.508(c)(1)(v). Similarly, the Final Rule provides that the statement "none" or similar language is sufficient to meet this provision if the authorization is for a covered entity to use or disclose protected health information for the creation or maintenance of a research database or repository.

4. MARKETING

Marketing has consistently been one of the most confusing, hotly debated and newsworthy areas of the Final Rule. Despite the fact that the Bush Administration actually toughened the Clinton marketing regulation in certain respects, consumer organizations have still been distressed about some of the exemptions. For example, the Proposed Rules permitted covered entities to use PHI for marketing without a specific patient authorization in face-to-face encounters, for products and services of nominal value, and for health-related services in certain circumstances.

The Final Rule retains the first two exemptions from the need for authorization in order to use PHI for marketing in face-to-face encounters, and for promotional gifts of nominal value. The use of PHI for all other marketing activities requires patient authorization, with limited exceptions for treatment, payment, health care operations and health plan coverage. The final amendments clarify that what constitutes marketing is not determined by the author's intent -- it is any communication about a product or service that, on its face, encourages the recipients of the communication to purchase or use a product or service. However, marketing does not include communications to an individual for treatment, case management or care coordination (which would include disease management, wellness initiatives and medication compliance reminders), or to direct or recommend alternative treatments, therapies, health care providers or care settings.

Thus, the Final Rule attempts to finesse the problem that has so bedeviled HHS and most state legislatures: how to permit legitimate uses of PHI for patient health promotion and care management activities that may

still involve promoting a service, product or drug, while precluding companies from using PHI simply to sell a product. The most widely discussed example has been whether covered entities may disclose PHI to pharmacists, drug companies or pharmaceutical benefit managers (PBMs) for medication compliance reminders, health information mailers and other direct patient contacts. When is it marketing and when is it a true health care service? If an HMO discloses PHI to a PBM that then uses it to promote a switch to one cholesterol drug (perhaps one in which it has a financial interest) from another the patient is already taking, is that still marketing even if there is substantial evidence that the new drug is safer or more effective? What if the drug company is paying the HMO for the patient lists? HHS seems to answer some of these questions when it says in the preamble that a communication that merely promotes health in a "general manner" and does not promote a specific product or service from a particular provider does not meet the general definition of "marketing." Such communications may include population-based activities to improve health or reduce health care costs as set forth in the definition of "health care operations." Therefore, communications, such as mailings reminding women to get an annual mammogram, providing information about how to lower cholesterol, about new developments in health care (e.g., new diagnostic tools), health or "wellness" classes, about particular classes of drugs (e.g., when to use Cox-II drugs as opposed to ibuprofen, or SSRI antidepressants instead of tricyclics); support groups; disease management and predictive modeling programs; and health fairs are permitted, and are not considered marketing.

Most of the health care industry seems to agree with HHS' approach in the Final Rules. HHS decided to amend the definition of "marketing" to close what commenters had called a "loophole" - in which covered entities, for remuneration, could disclose PHI to a third party that would then be able to market its own products and services directly to individuals. HHS cited the public's consternation that a drug company could pay a provider for a list of patients with a particular condition or who are taking a particular medication and then use that list to market its own drug products directly to those patients. Thus, HHS has amended the Privacy Rule so that "marketing" is defined expressly to include "an arrangement . . . whereby the covered entity discloses PHI to the other entity, in exchange for direct or indirect remuneration, for the other entity or its affiliate to make a communication about its own product or service that encourages recipients of the communication to purchase or use that product or service." These communications are marketing and can only occur if the covered entity obtains the individual's authorization. HHS believes that this provision will "make express the fundamental prohibition against covered entities selling lists of patients or enrollees to third parties, or from disclosing PHI to a third party for the marketing activities of the third party, without the written authorization of the individual."

On the other hand, HHS did not agree that a payment irrevocably transforms a treatment communication into marketing for which an authorization is required. For example, health care providers should be able to, and may, send patients prescription refill reminders regardless of whether a third party pays for or subsidizes the communication. The covered entity also is able to engage a legitimate business associate to assist it in making these permissible communications. It is only in situations in which, under the guise of a business associate, an entity other than the covered entity is promoting its own products using PHI it has paid for and received from the covered entity, that the remuneration will place the activity within the definition of "marketing." Unfortunately, HHS does not appear to answer the even more frequent scenario when there is no remuneration or when it is the health plan or insurer or employer that is paying the business associate to promote a service or drug or supply provided by the business associate. For example, what happens when a health plan provides PHI to a remote monitoring company so that the company may call patients who would benefit from using its products, and thereby reduce

costs and improve quality for the health plan? Does the remote monitoring company use the PHI on behalf of the health plan, the patient, the doctor or itself? It is often impossible to distinguish whether a business associate is promoting the use of a certain drug, or device or service mainly to lower costs or improve quality for the health plan, improve outcomes for patients or simply to make more money. The Final Rule says that the intent of the discloser or user of PHI does not control, which is a wise choice. However, by vaguely excluding from marketing communications to an individual for treatment, case management or care coordination, or to direct or recommend alternative treatments, therapies, health care providers or care settings, HHS leaves many specific situations to be resolved by future Guidance. Whether such Guidance will be promulgated in time to forestall litigation or regulatory enforcement action is unclear.

HHS also determined that covered entities may use PHI to communicate with members about health insurance products offered by the covered entity that could enhance existing health plan coverage. Under this exemption, a health plan is not engaging in marketing when it advises its enrollees about other available health plan coverage that could enhance or substitute for existing health plan coverage. For example, if a child is about to age out of coverage under a family's policy, this provision will allow the plan to send the family information about continuation coverage for the child.

A health plan is also not engaging in marketing when communicating about health-related products and services available only to plan enrollees or members that add value to, but are not part of, a plan of benefits. To qualify for this exclusion, a value-added item or service must meet two conditions. First, the value-added item or service must be health related. Second, it must add value to the plan's membership alone, rather than being a pass through of a discount or item available to the public at large.

5. BUSINESS ASSOCIATES

Like the Proposed Rules, the Final Rule adopted a transition period for certain business associate contracts that permits covered entities, other than small health plans, to operate under such contracts for up to a year beyond the April 14, 2003, compliance date. However, this transition period is available only to covered entities that have written contracts or other written arrangements with business associates prior to the effective date of the Final Rule, and only if those contracts or arrangements are not renewed or modified prior to April 14, 2003. This transition period was intended to afford covered entities (especially large covered entities) sufficient time to reopen and renegotiate existing contracts. Nonetheless, it does not relieve covered entities of their responsibilities related to making information available to the Secretary of HHS or to individuals during the transition period.

Additionally, HHS identified when business associate agreements are not required under the rules. For example, a business associate contract is not required for a janitorial service or for other entities whose functions, activities or services do not involve PHI, and where any access to PHI by such entities would be de minimis.

Moreover, to alleviate the burdens on covered entities, the Final Rule sets forth sample business associate contract provisions and revisions to the language in the Proposed Rules. For example, HHS clarified that a business associate agreement must permit the Secretary of HHS, not the covered entity, to have access to the business associate's practices, books and records. Although HHS did not include a complete model contract, there was specific guidance on many of the provisions, and HHS explained that the Privacy Rule does not prohibit other language, such as a provision that imposes monetary damages on a business associate for a violation of a covered entity's privacy policies.

6. ACCOUNTING OF DISCLOSURES

Section 164.528 of the Privacy Rule affords individuals the right to obtain an accounting of disclosures of PHI made by the covered entity, with certain exceptions. The Final Rule expanded these exceptions to include not only disclosures by the covered entity for treatment, payment or health

care operations and disclosures to individuals of PHI about them, but also any disclosure made pursuant to an authorization as provided in (section)164.508, disclosures that are part of a limited data set, and disclosures that are merely incidental to another permissible use or disclosure. These exceptions to the accounting requirement were adopted to alleviate the high costs and administrative burdens associated with the requirement, and because the requirement was intended as a means for the individual to discover non-routine disclosures as opposed to those disclosures the individual had previously authorized.

Furthermore, HHS simplified the accounting requirements for research disclosures in an attempt to affirm individuals' **rights** to an accounting while ensuring that important research is not halted simply due to the large volume of records associated with many research projects. In sum, the simplified accounting for research disclosures is warranted if the disclosure involves at least 50 records.

7. RESEARCH

In the Final Rule, HHS made several changes relating to the use and disclosure of PHI for research purposes. The Final Rule provides for a single set of authorization requirements for all uses and disclosures, including those for research purposes. It also allows the research-related authorization to be combined with any other legal permission related to the research study, including a consent to participate in the research. Authorizations for research projects will no longer have to include an expiration date. If there is no expiration date, however, this fact must be stated on the authorization form.

The Privacy Rule, as it was originally finalized in December of 2000, allowed certain uses and disclosures for research without a patient authorization if the covered entity first obtains either of the following:

- documentation of approval of a waiver of authorization from an Institutional Review Board (IRB) or a Privacy Board, including documentation that eight specific waiver criteria have been met, and
- when a review of PHI is conducted preparatory to research or when research is conducted solely on decedents' information, certain representations from the researcher, including that the use or disclosure is sought solely for such a purpose and that the PHI is necessary for the purpose

In the March 2002 proposed revisions, HHS simplified some of the waiver criteria, and the Final Rule adopts the simplifications. HHS stated that IRBs and Privacy Boards may initially struggle to interpret the criteria, so HHS plans to issue Guidance in the future to address this concern.

HHS promulgated several other clarifications relating to research. In response to concerns that the safe harbor method for de-identifying PHI was too stringent, HHS adopted a clarification stating that a re-identification code that could be used to allow the covered entity to re-identify de-identified PHI would not be considered one of the enumerated identifiers that must be removed in order to obtain safe harbor protection. More significantly, HHS added a new provision allowing a "limited data set" that can be used for research, public health or health care operations purposes if the covered entity:

- uses or discloses only a "limited data set" as defined in (section)164.514(e)(2), and

- obtains from the recipient of the limited data set a "data use agreement" as defined in (section)164.514(e)(4).

In order to qualify as a "limited data set," direct identifiers must be removed including:

- name
- street address
- telephone and fax numbers
- e-mail addresses
- Social Security numbers
- certificate/license numbers

vehicle identifiers and serial numbers
URLs and IP addresses, and
Full-face photos and comparable images.

A covered entity may disclose PHI in a limited data set to a researcher who has entered into an appropriate data use agreement without having to obtain documentation from an IRB or a Privacy Board that individual authorization has been waived for the purposes of research. The covered entity may not disclose any direct identifiers, however, without an individual authorization or documentation of an IRB or Privacy Board waiver.

HHS adopted Privacy Rule modifications providing for transition requirements for research begun prior to April 14, 2003. Covered entities may use or disclose PHI created or received for a specific research study prior to the compliance date if the covered entity has obtained any one of the following:

an authorization or other express legal permission from an individual to use or disclose PHI for the research study

the informed consent of the individual to participate in the research study, or

a waiver, by an IRB of informed consent for the research study in accordance with the Common Rule or FDA's human subject protection regulations.

8. MINIMUM NECESSARY

In the Final Rule, HHS largely retains the modifications it had made, in earlier Guidance and Proposed Rules, to the Clinton-era concept of restricting uses and disclosures to the minimum PHI necessary to satisfy a request or effectively carry out a function of a covered entity. The Bush Administration's view of the minimum necessary standard is still that the provision "is intended to be consistent with, and not override, professional judgment and standards, and that covered entities must implement policies and procedures based on their own assessment of what PHI is reasonably necessary for a particular purpose, given the characteristics of their business and their workforce."

However, the Final Rule did clarify other provisions. The Privacy Rule now exempts from the minimum necessary standards any uses or disclosures for which the covered entity has received an authorization. Although the Privacy Rule previously exempted only certain types of authorizations from the minimum necessary requirement, because the rule will now have only one type of authorization, the exemption is now applied to all authorizations. Minimum necessary requirements are still in effect to ensure an individual's privacy for most other uses and disclosures.

Some of the other provisions that HHS adopted with respect to the minimum necessary standard include:

With respect to disclosures to another covered entity, the Privacy Rule permits a covered entity reasonably to rely on another covered entity's request for PHI as the minimum necessary for the intended disclosure. HHS did not thus agree that a blanket exception for such disclosures is justified. The covered entity that holds the information always retains discretion to make its own minimum necessary determination.

Unless using or disclosing PHI on a routine and recurring basis, a covered entity must implement the minimum necessary standard by developing and implementing policies and procedures designed to limit its request for PHI to the minimum necessary to accomplish the intended purpose.

The exception to the minimum necessary rule for disclosures to or requests by health care providers for treatment purposes is retained. HHS wanted to ensure that access to timely and high-quality treatment was not impeded.

In certain cases, an entire medical record may be used or disclosed without running afoul of the minimum necessary test "for payment or health care operations purposes, including disease management purposes, . . . provided that the covered entity has documented the specific justification for the request or disclosure of the entire record." This was a significant

success for the disease management industry.

The Final Rule explicitly permits a covered entity reasonably to rely on a researcher's documentation or the representations of an IRB or Privacy Board that the information requested is the minimum necessary for the research purpose.

In an interesting specific example, HHS concluded that negotiation about the amount of PHI that constitutes the "minimum necessary" should be a routine aspect of compliance. For example, HHS recounts, if a pharmacist does not agree that the amount of information requested is reasonably necessary for a PBM to fulfill its obligations, "it is up to the pharmacist and PBM to negotiate a resolution of the dispute as to the amount of information needed by the PBM to carry out its obligations and that the pharmacist is willing to provide, recognizing that the PBM is not required to pay claims if it has not received the information it believes is necessary to process the claim in accordance with its procedures, including fraud prevention procedures."

9. INCIDENTAL DISCLOSURES

To alleviate concerns that the Privacy Rule's restrictions on uses and disclosures prohibit covered entities from engaging in certain common and essential health care communications and practices in use today and to quell fears that these restrictions would impede many of the activities and communications essential to the effective and timely treatment of patients, HHS modified the Privacy Rule to explicitly permit certain "incidental uses and disclosures" that occur as a result of a use or disclosure otherwise permitted by the Privacy Rule. An "incidental use or disclosure" is a secondary use or disclosure that cannot reasonably be prevented, is limited in nature and that occurs as a by-product of an otherwise permitted use or disclosure. These types of disclosures are permissible only to the extent that the covered entity has applied reasonable safeguards required by (section)164.530 (c) and implemented the minimum necessary standard in (section)164.502 (b).

HHS' reason for this change centered around the commonly held belief that prohibiting all incidental uses and disclosures would have a chilling effect on normal and important communications among providers and between providers and their patients, which would in turn negatively affect individuals' access to quality health care. Again, the Privacy Rule is not intended to impede common health care communications and practices that are essential in providing health care to the individual. HHS also noted that incidental disclosures do not have to be included by covered entities in the accounting of disclosures required under the Privacy Rule.

10. DISCLOSURE FOR TREATMENT, PAYMENT OR HEALTH CARE OPERATIONS OF ANOTHER ENTITY

In this Final Rule, HHS retained the Proposed Rules' important decision to allow covered entities to disclose PHI for the treatment, payment, and certain health care operations purposes of another entity. Specifically, the Final Rule provides that a covered entity may:

Use or disclose PHI for its own treatment, payment, or health care operations.

Use or disclose PHI for the treatment activities of any health care provider.

Disclose PHI to another covered entity or any health care provider for the payment activities of the entity that receives the information.

Disclose PHI to another covered entity for the health care operations activities of the entity that receives the information, if each entity either has or had a relationship with the individual who is the subject of the information, the PHI pertains to such relationship, and the disclosure is: (i) for a purpose listed in paragraphs (1) or (2) of the definition of "health care operations" which includes quality assessment and improvement activities, population-based activities relating to improving health or reducing health care costs, case management and care coordination, conducting training programs, and accreditation, licensing, or credentialing activities; or (ii) for the purpose of health care fraud

and abuse detection or compliance.

If it participates in an organized health care arrangement, disclose PHI about an individual to another covered entity that participates in the organized health care arrangement for any health care operations activities of the organized health care arrangement.

In response to commenters who were concerned that the precondition of a relationship with the patient would impede certain health care operations activities, HHS referenced the new limited data set provisions whose purpose is to provide a mechanism for disclosures of PHI for quality and other health care operations when the covered entity requesting the information does not have a relationship with the individual. Under those provisions, the final modifications permit a covered entity to disclose PHI, with direct identifiers removed, for any health care operations activities of the entity requesting the information, subject to a data use agreement.

One extremely significant request from the health care industry that was not approved promises to pose substantial compliance problems. The Final Rule affirms a proposed requirement that disclosures for health care operations may be made only to another covered entity. Because an individual's health information will no longer be protected (e.g., by a consent requirement) when it is disclosed to a non-covered provider (e.g., a provider who does not perform standard transactions), HHS believed that a covered entity should be limited to disclosing a limited data set, with direct identifiers removed, to a non-covered provider for any of the provider's health care operations purposes in the absence of individual authorization. Expanding the provision to allow disclosures to a third party for any of the third party's business operations would severely weaken the Privacy Rule, according to HHS. This determination now raises the specter of unintended violations by covered entities that provide PHI to a business associate for the health care operations of the covered entity that could arguably also be used for the health care operations or other purposes of the business associate.

In a related area, HHS gives the example of whether an HMO is permitted to disclose PHI for payment and health care operations both to an ERISA plan and to the plan's third-party administrator (TPA) or plan sponsor. HHS clarifies that

- if the Rule permits a covered entity to share PHI with another covered entity, the covered entity is permitted to disclose PHI to its business associate acting on behalf of that other covered entity. This is true with respect to all of the Rule's provisions. Also, an HMO may disclose PHI to a group health plan, or a third-party administrator that is a business associate of the plan, because the relationship between the HMO and the group health plan is defined as an OHCA for purposes of the Rule. . . . The group health plan (or the HMO with respect to the group health plan) may disclose PHI to a plan sponsor in accordance.

However, HHS did not respond to the commenters who requested that it clarify when a business associate was using PHI for the covered entity and when for its own operations, and how that determination relates to marketing. For example, may a health insurer or ERISA-plan-covered entity disclose PHI to TPA that uses the PHI for enrollment purposes but also uses the PHI to publish de-identified statistics about its performance to other potential customers? May an HMO disclose PHI to a disease management company if that company uses it in part to publish de-identified outcomes data? HHS should consider providing clarifications in new Guidance as soon as possible.

11. HEALTH CARE OPERATIONS: CHANGES IN LEGAL OWNERSHIP

In the Final Rule, HHS added to the language of the definition of "health care operations" to clarify that not only is it considered a health care operation when a covered entity uses or discloses PHI to conduct due diligence in connection with a sale or transfer of assets to, or a consolidation or merger with, an entity that is or will be a covered entity upon completion of the transaction, but it is also considered a health care

operation when a covered entity uses or discloses PHI as part of the sale, transfer consolidation or merger action itself. This change prevents the Privacy Rule from interfering with necessary treatment or payment activities upon the sale of a covered entity or its assets. However, this change does not affect a covered entity's other legal or ethical obligation to notify individuals of a sale, transfer consolidation or merger.

12. LIMITED DATA SET

The concept of a limited data set was adopted due to various concerns by state hospital associations, researchers and others that the de-identification standard could curtail important research, public health and health care operations activities. Thus, the Final Rule explains that a limited data set for research, public health or health care operations can be used if the covered entity: (1) uses or discloses only a "limited data set," and (2) obtains from the recipient of the limited data set a "data use agreement."

Like the de-identification provisions, the Final Rule specifies that direct identifiers that apply to the individual or to relatives, employers or household members of the individual must be removed from data to qualify as a limited data set. The direct identifiers include: name, street address, telephone and fax numbers, e-mail address, Social Security numbers, certificate/license numbers, vehicle identifiers and serial numbers, URL and IP addresses, full-face photos and other comparable images, medical record numbers, health plan beneficiary numbers and biometric identifiers including finger and voice prints. Notably, HHS did not list dates related to the individual, such as birth dates, or five-digit zip codes or other geographic subdivisions, such as state, county or city, except for street addresses.

Additionally, the covered entity must enter into a data use agreement with the intended recipient, which: (1) establishes the permitted uses and disclosures of such information by the recipient, consistent with the purposes of research, public health, or health care operations; (2) limits who can use or receive the data; (3) requires the recipient to agree not to re-identify the data or contact the individuals; and (4) contains adequate assurances that the recipient use appropriate safeguards to prevent use or disclosure of the limited **data set**

other than as permitted by the Privacy Rule and the data use agreement, or as required by law. HHS did not specify the form of the data use agreement, but did clarify that the minimum necessary requirements apply as well as the requirements related to non-compliance, such as taking reasonable steps to cure a recipient's breach and, if applicable, reporting problems to the Secretary of HHS.

13. PARENTS AND MINORS

In this section, HHS has embraced three goals with respect to parents and minors provisions in the Privacy Rule:

HHS wants to assure that parents have appropriate access to the health information about their minor children to make important health care decisions for them, while also making sure that the Privacy Rule does not interfere with a minor's ability to consent to and obtain health care under state or other applicable law.

HHS does not want to interfere with state or other applicable laws related to competency or parental **rights**, in general, or the role of parents in making health care decisions about their minor children, in particular.

HHS does not want to interfere with the professional requirements of state medical boards or other ethical codes of health care providers with respect to confidentiality of health information or with the health care practices of such providers with respect to adolescent health care.

In order to meet these goals, HHS continues to defer to state and other applicable laws with respect to parents and minors. Where the state or other applicable law is unclear or silent, HHS has created standards and requirements that allow states the maneuverability to continue to define the **rights** of parents and minors regarding health information

without interference from the Privacy Rule.

Therefore, HHS has modified two sections of the Privacy Rule to aid in the attainment of the above-mentioned goals. These changes are designed to prohibit activity that would be impermissible under state law. First, in order to assure that state and other applicable laws that address disclosure of health information about a minor to his or her parent govern in all cases, the language in the definition of "more stringent," currently in (section)160.202, that addresses the disclosure of PHI about a minor to a parent has been moved to the standards regarding parents and minors. Note that the deference to state or other applicable law includes established case law.

Secondly, HHS has changed the provisions regarding access to PHI of minors. The Final Rule defers to state or other applicable law regarding a parent's access to health information about a minor, but when the state or other applicable laws are silent or not explicit, the covered entity must analyze through a review of case law, attorney general opinions and legislative history to determine if such law permits, requires or prohibits providing a parent with access to minors' records. However, if the parent is not the personal representative of the child as defined in the Privacy Rule, the covered entity involved may use the discretion of a licensed health care provider to determine whether or not a parent should have access.

14. USES AND DISCLOSURES REGARDING FOOD AND DRUG ADMINISTRATION (FDA)-REGULATED PRODUCTS AND ACTIVITIES

Since HHS had a number of concerns about the scope of the disclosures permitted for FDA-regulated products and activities and the failure of the Privacy Rule to reflect the breadth of the public health activities currently conducted by private sector entities subject to the jurisdiction of the FDA on a voluntary basis, HHS deleted the phrases "if the disclosure is made to a person required or directed to report such information to the Food and Drug Administration" and "to comply with requirements or at the direction of the Food and Drug Administration." In lieu of this language, HHS added the language "a person subject to the jurisdiction of the Food and Drug Administration (FDA) with respect to an FDA-regulated product or activity for which that person has responsibility, for the purpose of activities relating to quality, safety, or effectiveness of such FDA-regulated product or activity."

These changes enable entities other than those "...required or directed to report..." to report to the FDA potential problems or health or safety threats concerning products approved by the FDA. Note, however, that the Privacy Rule limits disclosure to those made for public health activities and purposes, and that the minimum necessary standard still applies to public health disclosures. The Privacy Rule is not intended to discourage or prevent adverse event reporting or otherwise disrupt the flow of essential information that the FDA and persons subject to the jurisdiction of the FDA need in order to carry out their important public health activities.

15. INSTITUTIONAL REVIEW BOARD (IRB) OR PRIVACY BOARD APPROVAL OF A WAIVER OF AUTHORIZATION

HHS replaced the waiver criteria in the Proposed Rule, found in (section)164.512(i)(2)(ii), with the following waiver criteria:

(1) "The use or disclosure of PHI involves no more than a minimal risk to the privacy of individuals, based on, at least, the presence of the following elements:

a) An adequate plan to protect the identifiers from improper use and disclosure;

b) An adequate plan to destroy the identifiers at the earliest opportunity consistent with conduct of the research, unless there is a health or research justification for retaining the identifiers or such retention is otherwise required by law; and

c) Adequate written assurances that the PHI will not be reused or disclosed to any other person or entity, except as required by law, for

authorized oversight of the research project, or for other research for which the use or disclosure of PHI would be permitted by this subpart;(2) The research could not practicably be conducted without the waiver or alteration; and

(3) The research could not practicably be conducted without access to and use of the PHI."

These new criteria safeguard patient privacy, require attention to issues sometimes currently overlooked by IRBs, and are compatible with the Common Rule while also managing to ease the burdensome and duplicative provisions that were in the initial version of the waiver criteria. While IRBs and Privacy Boards may initially struggle to interpret the criteria, HHS intends to issue guideline documents to address this concern.

16. DE-IDENTIFICATION OF PROTECTED HEALTH INFORMATION

In order to address concerns that many entities were confused by potentially conflicting provisions within the de-identification standard, HHS added a provision to the safe harbor explicitly excepting the re-identification code or other means of record identification permitted by (section)164.514 (c) from the list of unique data elements that must be removed from PHI in order for the PHI to be considered de-identified. A re-identification code allows a covered entity to re-associate de-identified PHI with individual medical records.

For more information about Holland & Knight's HIPAA practice and HIPAA Team, please take this **link** to our HIPAA Team page.

The **content** of this article is intended as a general guide to the subject matter. Specialist advice should be sought about your specific circumstances.

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Industry Codes/Names: INTL Business, international

Descriptors: United States. Department of Health and Human Services--Laws, regulations and rules; Health care industry--Laws, regulations and rules; Health insurance industry--Laws, regulations and rules; Privacy, Right of--Laws, regulations and rules

Geographic Codes: 1USA United States

Event Codes/Names: 930 Government regulation;940 Government regulation (cont);980 Legal issues & crime

Statute Name: Health Insurance Portability and Accountability Act of 1996

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China opens up to Russia's mobile operators, mass media and television

Several major changes are planned in Sino-Russian co-operation in the fields of media, IT and Telecommunications. It was explained to Interfax by Alexander Kiselev, senior deputy minister of the Ministry of Communications and Informatization of Russia, that the changes have come about over a long period of mutual discussion between the two countries. He also said the moves follow the recent success of China's Huawei Technologies, which was given National Producer Status in Russia, and as several other Chinese IT producers such as ZTE expect to achieve a similar status soon.

According to a Joint Communiqué, issued following the meeting of China's PM Zhu Rongji and Russian PM Mikhail Kasyanov in Shanghai, received by Interfax, China will assist Russian mobile operators gain access to the Chinese telecommunications service market. Both sides consider the development and the industrial application of high-technology as an area with great potential for cooperation, and decided to boost the creation and development of joint hi-tech bodies, including hi-tech parks. For this purpose, the relevant legal foundations will be improved.

Sino-Russian networks should expect better interconnection following these agreements, recently China Telecom and Russia's Central Telecom signed an agreement on decreasing the fee for long-distance calls between the two countries.

The communiqué also stated both countries will vigorously increase cooperation in the field of mass media, television and cinema. Both sides decided to increase cooperation in the social and cultural spheres, on the foundations created by a political agreement signed last year.

In addition to four existing sub-commissions on co-operation in the fields of education, culture, health and sports (belonging to the Commission on Society and Culture), it has been decided to create a sub-commission for tourism, and to launch new working groups for cooperation in cinema and in the mass media.

Both countries also agreed to further co-operate in Space, following the framework of the joint agreement between the Russian Avionics and Space Agency, and the China State Committee on Defense Science, Technology and Industry. The original agreement was signed on April 17, 2002. Both sides have decided to formulate a "Joint Program of Cooperation between Russia and China in the Development, Production and Delivery of Advanced Avionic Technology."

HEADLINE NEWS

China Unicom confirms launch of prepaid CDMA service: "at appropriate time"

China Unicom (HK), the listing arm of China's second largest wireless carrier China Unicom, confirmed to Interfax in an exclusive interview that the company will launch a prepaid CDMA service, when the time is appropriate. The company will introduce prepaid CDMA service in the fourth quarter of this year, according to various reports, in a bid to boost sluggish subscriptions since the launch of CDMA service this January. This is a dramatic turn-around from the firm's original stance, when earlier this year it insisted it would concentrate on high-end users, a stance immediately questioned by most commentators on China's telecom market, as Unicom had previously only targeted low-end users for its GSM and pager

services. Both the firms branding and infrastructure seemed to deny it could leap frog the dominant China Mobile in china's mobile communications market.

China Unicom currently provides the second-generation CDMA service only to contract users, still mainly targeting high-end users. However, most industry analysts predict that the company will have to shift to low- and medium-end market soon, due to the much less-than-expected subscription. A report from Beijing Chenbao said that the impending prepaid CDMA service would mainly target college students, who are believed to be potential high-end users in the future. Sophia Tso, director of China Unicom (HK)'s corporate communications division, did not deny the report in the interview with Interfax, but she said that her company so far does not have any detailed plans on the prepaid CDMA service yet, though they will be launching such a service

China Unicom has already lowered its projected CDMA subscriber numbers to 7 mln for this year, from the initial 10 mln. But market watchers still questioned the target, saying that China Unicom could have at most 5 mln CDMA users by the end of this year. To attract users, China Unicom introduced several preferential policies, including free CDMA handsets and free phone calls for a certain amount of CDMA phone call minutes over a three-year period.

CLSA predicts that China Unicom's CDMA promotion fee will reach RMB 2 bln (USD 240 mln) this year. This considerable expense, even if it is apportioned over the next three years, will raise the operating expenses of China Unicom by RMB 670 ml (USD 80.9 mln). In order the ease the shortage of CDMA mobile phones, China Unicom has also spent RMB 1 bln (USD 121 mln) in buying CDMA mobile phones directly from manufacturers, according Yu Xiaomang, vice president of China Unicom.

HEADLINE NEWS

Exports of China's electronic information industry to exceed USD 100 bln by 2005

Exports by China's electronics information industry are expected to exceed USD 100 bln by 2005. Added value of China's information industry will reach RMB 920 bln (USD 111 bln) by 2005, accounting for more than 7% of the country's gross domestic product (GDP), according to Ji Jinkui, director of the informatization promotion division under the Ministry of Information Industry (MII).

Exports of China's electronic information industry reached USD 65 bln last year, according to Zhongguo Xinwen She. The figure is expected to further rise to USD 70 bln this year. Under the 10th 5-Year Plan set by the MII, sales revenue of electronic information products will reach RMB 1.5 trillion (USD 181 bln), an average growth rate of 20% in the 5 years from 2001 to 2005, said Ji.

By 2005, revenue of China's communications industry will reach RMB 1 trillion (USD 121 bln), according to the 10th 5-Year Plan. Capacities of both fixed-line telephone and mobile phone networks will become the largest in the world, with a telephone penetration rate of around 40%. The number of Internet-connected computers will rise to 40 mln sets. In addition, China will have 200 mln data, multimedia and Internet users, with Internet users accounting for 15% of the country's total population.

HEADLINE NEWS

China on course to replace U.S. as top exporter to Japan

China is likely to overtake the United States to become the top exporter to Japan in the second half of 2002, according to the Japan External Trade Organization (JETO).

About 17.8% of commodities Japan imported in the first half of 2002 came from China, making China the second largest exporter to Japan, second only to the United States, which accounted for 18.2% of Japan's imports during the period, Renmin Ribao reported. If the current trend is maintained, the gap may soon be reversed, noted a JETO official.

Meanwhile, according to information Interfax obtained directly from the JETO, the imports of manufactured products from China totaled USD 48.8

bln in 2001, resulting in China becoming Japan's largest supplier of manufactured goods, ahead of even the United States, for the first time ever.

The JETRO announced that total trade between Japan and China in the first half of 2002 grew 3.4% from the same period last year to USD 45.12 bln, setting an all-time first-half record for the third consecutive year. Automobile, steel, and metalworking machinery led the expansion of Japan's exports to China. Machinery and equipment, the top category for exports to China for the second consecutive year, accounted for 33.9% of total first-half imports from China due mainly to increasing imports of machinery and equipment from Japanese-affiliated companies which have shifted their production to China.

HEADLINE NEWS

China Mobile (HK) reports 107.434 mln GSM subscribers, subscription growth further declines

China Mobile (HK), the listing arm of China's largest wireless carrier China Mobile, announced to Interfax that its GSM subscribers in 21 Chinese provinces, including those of the 8 provincial subsidiaries China Mobile (HK) acquired from its parent early this year, reached 107.434 mln as of July 31, 2002. This represented an addition of 1.989 mln in July and 16.864 mln in the first 7 months of this year.

GSM subscribers of China Mobile (HK) as of July 31, 2002

Source: China Mobile (HK)

China Mobile (HK) currently operates GSM mobile networks in 21 Chinese provinces including Guangdong, Zhejiang, Jiangsu, Fujian, Henan, Hainan, Beijing, Shanghai, Tianjin, Hebei, Liaoning, Shandong, Guangxi, Anhui, Jiangxi, Chongqing, Sichuan, Hubei, Hunan, Shaanxi and Shanxi through its 21 wholly-owned subsidiaries. The 8 newly acquired subsidiaries provide GSM service in Sichuan, Chongqing, Hubei, Hunan, Anhui, Jiangxi, Shaanxi and Shanxi.

As of July 31, 2002, the 8 provincial subsidiaries China Mobile (HK) acquired had a total of 25.664 mln subscribers, which included 13.426 mln contract subscribers and 12.238 mln prepaid subscribers. Net addition of subscribers for the combined 8 new subsidiaries was 521,000, comprising 51,000 contract subscribers and 470,000 prepaid subscribers.

Excluding new subscribers of 521,000 recorded by the 8 acquired subsidiaries, China Mobile (HK) achieved an addition of only 1.468 mln, 4.7% less than that of June and much less than the average addition of 1.777 mln in the first half of this year. Wang Xiaochu, CEO of China Mobile (HK) admitted that the promotion campaign of China Unicom's CDMA service had already imposed negative influence upon the company's operation.

HEADLINE NEWS

China Unicom (HK) reports 34.151 mln GSM users and 1.258 mln CDMA subscribers at July end

China Unicom (HK), the listing arm of China's second largest wireless carrier China Unicom, announced to Interfax that its GSM mobile phone subscribers increased to 34.151 mln as of July 31, 2002, representing an addition of 1.021 mln in July and 7.118 mln in the first 7 months of this year. Subscription of the company's new CDMA mobile service was a little accelerated, with CDMA subscribers rising to 1.258 mln as of the end of July from 936,000 in the previous month.

Mobile phone subscribers of China Unicom (HK) as of July 31, 2002

Source: China Unicom (HK)

As of the end of July, China Unicom (HK) recorded registered Internet access service subscribers of 4.806 mln, an addition of 373,000 in the month. Despite a series of mergers and acquisitions of small- and medium-sized paging companies, the paging business of China Unicom (HK) still suffered a significant loss of 1.142 mln subscribers in July, falling to 22.539 mln as of July 31, 2002. In the first 7 months of this year, usage volume of China Unicom (HK)'s outgoing long-distance telephone calls reached 3.487 bln minutes, while that of outgoing IP telephone jumped to 3.38 bln minutes.

International and domestic long-distance telephone services of China Unicom (HK) as of July 31, 2002

Source: China Unicom (HK)

HEADLINE NEWS

Shanghai's communications industry sees revenue up 25% while investment down 36% in 1H

The communications industry of Shanghai recorded sales revenue of more than RMB 10 bln (USD 1.2 bln) in the first half of this year, representing a year-on-year growth rate of approximately 25%, and accounting for 4% of the city's GDP. About 98% of the total revenue came from three major operators, including Shanghai Mobile, Shanghai Telecom and Shanghai Unicom. Despite the revenue increase, telecom infrastructure investment of Shanghai plunged by RMB 1.3 bln (USD 157 mln) to only RMB 2.3 bln (USD 278 mln), accounting for less than 25% of the total investment made last year.

Fixed-line telephone users in Shanghai increased 313,000, or 11.6%, to 6.477 mln as at the end of June, of which, 6.457 mln, or 99.7%, are subscribers to Shanghai Telecom and 20,000, or 0.3%, are Shanghai Railcom users. Mobile phone users in Shanghai surged by 58%, or 1.315 mln, to 7.596 mln in the first 6 months, in which, 45,000 are CDMA users. Among 169 mobile phone users, 168 people are GSM users while only one is a CDMA user, reported Tongxin Shijie. Due to the development of mobile communications, paging users dropped further to 2.358 mln as at the end of June, 28.6%, or 650,000 less than that at the end of last year.

Telephone penetration rates for Shanghai, Beijing, Tianjin, Guangdong and Chongqing in first half of 2002

Source: Ministry of Information Industry

Because of the adjustment of billing rate for fixed-line telephones, usage volume of local fixed-line telephone calls dropped nearly 1 bln minutes to only 21.16 bln minutes in the first half of this year, while that of long-distance fixed-line telephone calls fell by 20 mln minutes to 940 mln minutes. The loss on fixed-line telephone business was taken up by mobile phone and IP telephone sectors. During the period, usage volume of mobile phone calls increased by 36% to 6.04 bln minutes, while that of IP telephone calls up 96% to 990 mln minutes. Of total mobile phone calls, local mobile phone calls increased by 41% to 5.15 bln minutes, while long-distance mobile phone calls edged up by 8.5% to 890 mln minutes.

POLICY & REGULATIONS

Beijing unveils development plan for its microelectronics base, eyes revenue of USD 24 bln by 2010

Competing with Shanghai's plan to become the "Silicon Plain", officials in Beijing, home of Zhongguancun "China's Silicon Valley," announced an ambitious plan to develop the city into a major microelectronics base in China. Under the city's plan, about 20 integrated circuit (IC) chip production lines and 200 specialized design companies for IC cards will be established in Beijing by 2010. Total revenue of Beijing's microelectronics industry is expected to exceed RMB 200 bln (USD 24 bln) by that time.

As a momentum in the development of Beijing's microelectronics industry, Semiconductor Manufacturing International Corp. (SMIC), Shougang Corp., Beijing University and investors from Europe and Taiwan will jointly set up Beijing Semiconductor Manufacturing Corp. (BSMC) with a total investment of USD 1.25 bln. An 8-inch 0.18-micron IC chip production line and a 12-inch 0.10-micron line will be installed at BSMC. Equipment installation will start next September while trial operations will start by the end of next year, reported Beijing Xiandai Shangbao.

Another major project in Beijing's microelectronics base plan is the Beijing Integrated Circuit Design Park. The park will exempt land rents to IC design companies in the park for 30 years. In addition, to ease the huge financial pressure and investment risks of IC design companies, the government will provide investment equal to 15% of the registered capital of IC design companies located in the park. The government will also

provide low-interest loans to approved projects in the park. As of the end of 2001, the number of IC design companies in Beijing has risen to 60 from 23 one year ago, and big firms like Legend and Haier have all announced investment plans in IC design.

Beijing's huge development plan in the microelectronics industry is based on the great potential of China's IC market, as well as the predicted rising demands for IC chips in the near future, said Dr. Liang Sheng, director of Science & Technology Division under Beijing Municipal Economic Commission. Introduction of ID smart cards, impending launch of **digital** TV broadcasting and 2008 Beijing Olympics will also create a huge demand for microelectronics products, especially IC chips. Liang predicts that the adoption of IC smart cards itself will generate sales of IC chips worth at least RMB 10 bln (USD 1.2 bln). In addition, the 2008 Beijing Olympics will create a huge market for **digital** cameras and **digital** video cameras.

POLICY & REGULATIONS

MII releases new regulations on Internet Domain Name management
China's Ministry of Information Industry released regulations (MII) on Internet Domain Name (DN) management, which will take effect from September 30, 2002. Authorized by the MII, China National Network Information Center (CNNIC) will release detailed rules on registration of dot CN and Chinese DN, and settlement of DN disputes.

Under the new regulation obtained by Interfax, any DN registration institutions should first register with the MII to obtain an operating license. They will be responsible for operation and management of DN systems, maintenance of DN databases, and DN registration service. The regulations iterate that Chinese-language DN is an important part of China's DN system, and MII encourages the technical research and promotion of a Chinese-language DN system.

As a result of the new regulation, CNNIC confirmed that it would simplify the registration procedures of dot CN Domain Names, except GOV.CN, reported Beijing Yule Xinbao. Those who wish to register no longer need to submit any paper documents to CNNIC for DN applications, as applications for a dot CN DN are now possible online, and can be put into use 6 hours after registration. Although the top-level DN of dot CN is still closed to individuals, they can apply for second level DN of dot CN (second level DN are those such as .com.cn or .net.cn). DN registration fees for both individual and corporate registrations will be sharply cut, and charges for individuals will be only half of that for corporate users.

Liu Zhejiang, director of the CNNIC, said that a Chinese-language DN system is still under trial operation, and is not available for registration use yet. The new Internet DN management regulations aims to change the bias that the DN of dot COM is superior to dot CN. As a result, many domestic websites in China have registered dot COM DN, instead of dot CN, according to Liu. At present, in China, there are 120,000 websites with dot CN DN, while the number of websites with dot COM DN is more than 600,000.

POLICY & REGULATIONS

"Concerted efforts" against illegal capital flight under consideration

Illegal activities have led to a serious capital flight problem in China, according to officials cited in Zhongguo Ribao, and China plans to make "concerted efforts" to prevent officials from channeling public money abroad. The news comes amid concerted efforts by the Chinese government to crack down on activities such as money-laundering, false-accounting, and tax evasion and avoidance.

More than 4,000 people suspected of embezzling state funds or soliciting bribes have already fled the country, absconding with about RMB 5 bln (USD 600 mln), the report states.

According to a study by Beijing University, the figure for illegal capital flight stood at USD 36.4 bln in 1997, USD 38.6 bln in 1998 and USD 23.8 bln in 1999, and officials have said that since then the increase has

been alarming.

In a related report, Zhongguo Ribao also quotes Wei Jianxing, a senior official, who said that "striking hard" against corruption should remain a priority this year.

In July, the People's Bank of China implemented a series of regulations to fight money-laundering, and ordered every commercial bank to set up monitoring systems by January of 2003. A center to monitor "suspicious" transactions was also established alongside the department responsible for inspecting transfers of money abroad.

NETWORKS & EQUIPMENT

AT&T announces launch of MDNS service and extension of global RAS in China through UNISITI

AT&T announced to Interfax that it has launched a Managed Data Network Service (MDNS) to business customers in major cities in China through its subsidiary UNISITI. In addition, it has extended the reach of its global Remote Access Services (RAS) in China through a new UNISITI dial access node in Shanghai. UNISITI is the first Sino-foreign telecom service joint venture in China, set up by AT&T and its Chinese partners, Shanghai Telecom and Shanghai Information Investment Inc. The company commenced operations this March.

AT&T MDNS and RAS service are designed for businesses that are looking to reduce the resources they dedicate to building and supporting their regional or global company networks. The service offers customers a way for businesses to incorporate mission critical applications into their existing network. It can also **link remote** or mobile employees, customers and partners in almost any location around the world.

AT&T MDNS is built on WAN technology based on frame relay. It offers a highly reliable and secure connectivity, complemented with comprehensive network design and installation support, and network management provided by AT&T and UNISITI. The extension of AT&T RAS adds to AT&T's existing IP remote access node in Beijing and will provide business travelers and remote workers greater ease-of-use and improved dial connections. The UNISITI dial node in Shanghai will also support Internet roaming, expanding the coverage of the AT&T Business Internet Services to include Shanghai.

Rick Luk, president of UNISITI said his company will offer the AT&T MDNS to customers in Shanghai, while a recent service agreement will enable China Telecom to offer the service in key cities including Beijing, Tianjin, Dalian, Suzhou, Nanjing, Guangzhou and Chengdu.

NETWORKS & EQUIPMENT

China Netcom to supply China Mobile with WAN solutions based on Equant Frame Relay

China Netcom, the second largest fixed-line telecom carrier in China, has been awarded a three-year contract by China Mobile, the largest wireless carrier in China, to provide a wide area network (WAN) solution based on Equant Frame Relay. The contract signifies that China Netcom now can provide solutions to companies that need domestic and global network services.

The service China Netcom provides to China Mobile was made possible through the strategic partnership between China Netcom and New York-listed Equant, a leading provider of IP and data services for multinational businesses, which was signed last year. Since the partnership, Equant and China Netcom have secured agreements with companies wishing to connect into China as well as China-based companies connecting globally. The China Mobile contract marks the partnership's first implementation of an end-to-end international service both inside and outside China, Equant told Interfax in a statement.

The cooperation between the domestic China Netcom network and the global Equant network enables China Mobile to connect to its business partners in Denmark, Germany and Luxembourg, enhancing data clearance for its international roaming service and extending its service portfolio for the customers. In addition, the worldwide scope of this network service

makes the exchange of China Mobile data easier for cross-border mobile users.

NETWORKS & EQUIPMENT

Huawei announces contracts in Russia and Thailand, sets up training center in Brazil

Shenzhen-based Huawei Technologies, a leading telecom equipment provider in China, announced to Interfax that it has secured a contract with Russia's Beeline-Samara to supply high-performance and cost-effective GSM 1800 equipment, related software and after-sales services. The company was also selected by Thailand's Advanced Info Service (AIS) to build an intelligent network in Thailand.

Beeline-Samara, the largest AMPS/DAMPS (**Digital** Advanced Mobile Phone System) operator in Russia, currently is building a GSM 1800 mobile network, and plans to migrate its existing DAMPS subscribers to the more advanced GSM network in the near future. The company is a 50% subsidiary of VimpelCom, one of the largest mobile operators in Russia with approximately 2.11 mln subscribers at the end of 2001.

Under the agreement, Huawei will supply a complete GSM network solution, including HLR (Home Location Register), MSC (Mobile Switching Center), and BTS (Base Station System) with a capacity of 100,000 subscribers for the first phase of the project. The company secured the contract in a bidding, participated by several vendors from Europe and North America. So far, GSM systems of Huawei have been deployed by 10 Russian mobile operators.

Huawei will also help AIS, the largest mobile operator in Thailand, to develop an intelligent network for the prepaid service. The project, expected to be completed within this year, will boost the capacity of AIS's prepaid One-2-Call service to 10 mln users from the current 6 mln. Besides provision of equipment and technologies, Huawei will also set up a research center for AIS. Total value of the contract stood at USD 50 mln, being the largest deal to date for Huawei in Thailand.

In related news, Huawei told Interfax that it has launched an authorized training center in Brazil in cooperation with IMPACTA. Pursuant to the agreement signed earlier this March, Huawei will open a variety of learning courses on its datacom product portfolio to support network professionals and datacom distributors with the latest networking technologies. In addition, Huawei has selected Inster as distribution agent in Mexico for its datacom products.

NETWORKS & EQUIPMENT

Lucent Technologies announces 4 optical contracts in China worth USD 15 mln in total

Lucent Technologies announced to Interfax that it has been awarded a series of optical contracts worth USD 15 mln in total by Shanghai Telecom, Guangdong Unicom, Zhongshan Telecom and Zhejiang Telecom to supply optical networking systems in China's Shanghai, Guangdong and Zhejiang regions. The optical equipment to be supplied includes a next-generation optical transport system and a switch, the LambdaUnite Multi-Service Switch (MSS), both are multi-service metro access products from Lucent's WaveStar family and network management systems from the Navis Optical Management Solutions family.

Under the contract with Shanghai Telecom, a regional subsidiary of China Telecom, Lucent will supply the LambdaUnite MSS, WaveStar DACS 4/4/1, and other multi-service metro access systems to help support network expansion in Shanghai. This is the second publicly announced sale of LambdaUnite in China, which is a system that serves as a bridge between data-intensive metro networks and high-speed optical core networks.

Lucent will also provide Guangdong Unicom with the WaveStar ADM 16/1 and WaveStar AM1Plus to support its local SDH network, expanding network capacity to cover the cities of Zhanjiang, Maoming, Yangjiang and Jiangmen in Guangdong Province. It will also help Zhejiang Telecom build its local network in Wenzhou by providing the WaveStar ADM 16/1, WaveStar ADM 16/1Compact, WaveStar AM 1 Plus and network management systems.

In addition, Lucent will provide Zhongshan Telecom with the WaveStar TDM 10G SDH transport system for Zhongshan's 10G transport network project. Other equipment involved in the contract includes WaveStar DACS 4/4/1 **digital** cross-connection equipment and network management systems from the Navis Optical Management Solutions family.

NETWORKS & EQUIPMENT

Shanghai Telecom selects Juniper Networks to expand broadband service offerings

NASDAQ-listed Juniper Networks, a leading provider of public network infrastructure, announced to Interfax that it has entered into an agreement with Shanghai Telecom, a regional subsidiary of China Telecom to supply its ERX Edge Routers for the carrier's second phase expansion of broadband network. Contract value was not disclosed.

The deployment will underpin enhancements to both the quality and the range of Shanghai Telecom's broadband services. The ERX routers will be installed in 8 major points of presence throughout the city of Shanghai, providing access services for the growing installed base of broadband users. Shanghai Telecom selected the ERX for its comprehensive subscriber management or Broadband Remote Access Server (BRAS) capabilities, wire-speed performance and ability to enhance standard broadband connectivity offerings with IP services.

The ERX router, an integrated solution that combines subscriber management capabilities with carrier-class edge routing, delivers high concentration of routing connections. Built on an IP routing infrastructure that includes IP Quality of Service, this ERX router deployment enables next-generation services required by Shanghai Telecom customers, while scaling for future growth and maintaining legacy services.

NETWORKS & EQUIPMENT

South Korea's Locus wins SMS contract with Zhejiang Unicom, targeting USD 12 mln revenue this year

South Korea's Locus was awarded a contract by Zhejiang Unicom, a provincial subsidiary of China Unicom, to supply its SMS (Short Messaging Service) Center service system for the carrier's GSM mobile network. Besides all equipment and software, Locus will also provide extensive support services, including project management, installation and technical training to Zhejiang Unicom.

Being in China for less than one year, Locus has already secured a substantial market in China, whose SMS system serves a subscriber base of almost 80 mln people. The company has about 40% of China Unicom's SMS market and 10% of China Mobile's SMS market. The company told Interfax that it is expecting to achieve sales revenue of RMB 100 mln (USD 12 mln) this year. James H. Kim, CEO of Locus said that his company will focus on deployment of its SMS products in Shanghai, Guangdong and Beijing by supplying additional CTI and call center solutions.

To establish its presence in China, Locus acquired a local mobile phone solution provider who serves subscribers in 14 cities including Beijing, Shanghai and Tianjin. Locus also launched an Information-on-Demand (IOD) service in China to deliver entertainment content, games, and chatting service to subscribers in 19 cities of Guangdong and Fujian provinces. It plans to expand its IOD service to a maximum of 25 cities by adding 3 to 5 cities to its coverage within this year.

NETWORKS & EQUIPMENT

BIRTV 2002 heralds China's **digital** TV launch

Beijing International Broadcasting Film and Television Equipment Exhibition 2002 (BIRTV 2002) opened this week in China's capital. As China plans to launch **digital** TV networks in the near future many international **digital** equipment suppliers are among the exhibitors. More than 360 companies have made the trip, and the show features 600 exhibitors.

According to the State Administration of Radio, Film and Television (SARFT) the event sponsors include China Central Television (CCTV), China Film Equipment Corp. and several broadcast research institutes.

Following the formation of China's Radio, Film and Television group (CRFTG), which is responsible for transactions relating to television broadcast programming, both within China and programming from abroad, the country has made more unified efforts in staging large television related events.

At the beginning of this year, with the approval of national General Administration for Industry and Commerce, BIRTV becomes a national registered trademark. The first BIRTV was held in 1987.

INTERNET

Tom.com backs out of USD 46.5 mln investment in ATV and HKATV.com

Tom.com announced to Interfax the company will terminate the Memoranda of Understanding (MoU) signed on July 9, 2002 under which TOM agreed to purchase interests in Asia Television (ATV) and HKATV.com Ltd. held by Lai Sun Development Co. Ltd. (Lai Sun) and eSun Holdings Ltd. (eSun) respectively. Tom.com says it was unable to conduct any meaningful due diligence investigation on Asia Television (ATV), and served termination notices to Lai Sun and eSun.

Tom.com said that the company adopts a prudent and disciplined approach to all its investments, and it is also important that partners in any investment share the same view in the development and direction of the business. Tom originally announced to Interfax that the MoU was to acquire a 32.75% interest in Asia Television Limited (ATV) and a 50% stake in HKATV.com Limited, the Internet arm of ATV. The total deal was worth HKD 361.9 mln (USD 46.5 mln).

This termination marks Tom.com's backing out of China's chaotic broadcasting market, though other reports have indicated that Tom.com is in constant contact with News International to buy a share of its China broadcasting assets.

Media reports have indicated that ATV recently was granted broadcasting **rights** in China's Guangdong Province by China's State Administration of Radio, Film and Television (SARFT), following Phoenix TV, Star TV and AOL Time Warner. Two ATV channels will be carried on Guangdong Cable network.

In China Guangdong Province, partly due to its proximity to Hong Kong, has the most lax provisions for broadcasting. Other parts of China, especially major commercial centers Beijing and Shanghai, have broadcasts strictly controlled by authorities.

Other provinces such as Hebei and Hunan are also making great strides in advancing television content, creating their own more independent programming, as well as hosting more foreign shows. These provinces have also been chosen by SARFT for pilot schemes to implement its long-touted China wide video-on-demand (VOD) system, whereby users could pick programs from an on screen menu, with the program data base centrally administered in Beijing. To date, no regional cable or Television operator has expressed much enthusiasm for a SARFT administered database of programs, as they would lose lucrative advertising revenues and would in effect be reduced to being merely fee collectors for set top box and cable subscriptions. SARFT and members of the State Council have expressed it is imperative that TV content in China is improved, with SARFT officials blaming poor content on having a too diverse structure for TV nationwide, and hopes to centralize the whole system, so being able to afford blockbuster productions.

Liu Changle, who holds holding interests in Phoenix and ATV, has a strong government background and has been trying to negotiate a share of China's diverse TV and advertising market for many years, a former Phoenix TV-employee told Interfax. Phoenix TV is currently available on cable in certain categories of high-end housing in Shanghai and other cities, and recently the firm has seen more success in securing advertising clients, but will not really hit the more lucrative end of the market until their channels can be broadcast to mass audiences in China.

In Guangdong, viewers far wider access to programs is partly due to users installing satellites or aerials that pick up Hong Kong and foreign

satellite transmissions, so any deal to allow a Hong Kong channel into Guangdong is only legitimizing what is already happening in fact, and with legitimate audience figures the channels will be able to accrue China advertising revenues. When channels are allowed out of the special Guangdong zone it will mark a significant sea-change in China's broadcasting policy. In Beijing and Shanghai residents who install outside satellites, or CATV facilities have the equipment unceremoniously confiscated or destroyed by officials in what were once yearly campaigns, but now operated on a regular basis.

As previously reported by Interfax (SARFT) and China Central Television (CCTV) are also in talks with Rupert Murdoch's News Corp and France-based Vivendi Universal with the aim of introducing foreign pay-TV channels and making some CCTV programming available in Europe.

INTERNET

Tom.com further clarifies its decision on terminating acquisition in ATV and HKATV.com

Tom.com, a leading media company listed on Hong Kong's Growth Enterprises Market, denied that its terminated acquisition in Asia Television (ATV) and HKATV.com Ltd. was a result of pressure from mainland China's central government. In a statement sent to Interfax, Wang Xian, CEO of Tom.com, said that the decision was made from a business angle, and the company could not guess the opinion of central government upon this issue.

Wang reiterated that the frustration in not acquiring ATV would not change Tom.com's strategy to become a multimedia giant. "TV media is not the only way to make profit, and ATV is also not the only opportunity for Tom.com to enter the TV media industry. Tom.com is open to any potential business opportunities, but so far does not have any acquisition plan," said Wang.

Tom.com terminated acquisition of a 32.75% interest in Asia Television (ATV) and a 50% stake in HKATV.com Ltd., which are held by Lai Sun Development Co. Ltd. and eSun Holdings Ltd. respectively, after ATV was granted broadcasting **rights** in southern China's Guangdong Province. Two ATV channels will be carried on Guangdong Cable network.

Wang said that Tom.com terminated the acquisition at an appropriate time as it was unable to conduct any meaningful due diligence investigation on Asia Television (ATV). He denied that the decision made was related to the broadcasting **rights** ATV was granted. In fact, the company has already been informed during the acquisition talks.

Wang also said that he was sorry to hear a series of rumors caused by Tom.com's acquisition plan in ATV. Tom.com adopts a prudent and disciplined approach to all its investments, and it is also important that partners in any investment share the same view in the development and direction of the business. As to the reported intention of Tom.com to want to monopolize the media industry, Wang said that it is natural for outsiders to hold different opinions on the acquisition. Tom.com always ranks the interest of its shareholders first, he explained.

INTERNET

Huge loss pushes Greatwall Broadband to shift operations to Internet content provision

Huge losses have finally led to a complete change in the development strategy of Greatwall Broadband, a last-mile broadband Internet access service provider under Greatwall Group. The company said that it has decided to shift its business to Internet content provision, instead of Internet access service provision. As a major move in the operation shift, the company will launch an integrated broadband service platform with other ICPs including SINA, NetEase.com and Tom.com, and is also in talks with Maya AV to jointly produce cable TV programs.

Greatwall Broadband suffered a huge loss of more than RMB 200 mln (USD 24 mln) with poor revenue of only RMB 20 mln (USD 2.4 mln). The company now has 100,000 broadband Internet access service subscribers in China, and in Shanghai, it has 30,000 users. The subscriber figure is far from the estimated 220,000 users that can support the company's break-even

point, according to Guoji Jinrong Bao.

Greatwall Broadband currently charges each user of RMB 500 (USD 60) for initiation of services. Admitting the installation fee would be further decreased due to increasingly fierce competition, Sun Ziqiang, new general manager of Greatwall Broadband, said that his company aims to boost its subscriber base to more than 150,000 before the installation fee is slashed, and targets breaking even by next April. In southern China's Fujian Province, Fujian Telecom already cut the installation fee for its broadband access service to RMB 100 (USD 12) from the former RMB 300 (USD 36).

INTERNET

CSRC grants online stock trading licenses to 13 additional securities firms

China Securities Regulatory Commission (CSRC) announced to Interfax that it has approved another 13 securities companies to carry out online stock trading services. These companies include North Securities, Chuancai Securities, Dongguan Securities, First Venture Securities, Guangdong Ming'an Securities, Guohai Securities, Hengxin Securities, Hongyuan Securities, Huizhou Securities, Shandong Qilu Securities, Tianjin Yide Securities, Xiamen Securities and Zhongguancun Securities.

CSRC adjusted rules on stock trading commissions this May, allowing brokerages to implement their own commission rate. Fierce competition pushed most brokerages to launch low-cost online trading service, which led to a substantial increase in online stock trading turnover since this year. Statistics from the CSRC showed that online stock trading turnover increased by 5.9% to RMB 75 bln (USD 9 bln) this June, accounting for 8.73% of the total stock trading turnover recorded by both Shanghai and Shenzhen stock exchanges.

As of the end of June, there are 4.512 mln online stock trading accounts in China, about 40,000 more than that recorded one month earlier.

INTERNET

USD 7.2 mln E-government pilot project to be launched in Shenzhen

The Central Government has selected Shenzhen and three other cities to conduct e-government pilot project beginning mid-September. After the experiments in Shenzhen, Qingdao, Mianyang and Nanhai, to last until the end of next year, the e-government projects will be expanded nationwide as part of the government's efforts to become more transparent, efficient and updated. According to a release by the Information Office of Shenzhen the city will spend RMB 60 mln (USD 7.2 mln) on the scheme. The trials in Shenzhen will focus on on-line government services and reflect the reform of the official approval system. This would allow individuals and enterprises to apply for government approval for business and other registrations at home or office with a click. Key projects will include electronic tax declaration, online company registration and community information service. Some of the projects are believed to have been under development already. The municipal government will invite companies to take part in the bidding for some e-government projects starting from Sept. 15. The winners will be announced before Oct. 25.

INTERNET

Beijing Internet bar patrons travel to nearby Hebei province to go online

Following the recent mass closures of Internet bars in Beijing it has transpired that many students are travelling as far as neighboring Hebei province to go online, and play network LAN games.

Blamed on the student's "Network (Internet) addiction," the majority of visitors are said to be middle school students, who are on holiday until September 1. The behavior was condemned as unsafe, both due to the long distances students are traveling, as well as the lax controls being enforced in Hebei.

Beijing Qingnian Bao carried out an investigation, and found out that prices in Hebei are cheaper than the capital, and age restrictions are not enforced. The reporter also found that most bars had no operating

license, and flaunted all the recently much publicized safety provisions, such as opening windows, banning smoking, and installing fire extinguishers.

The journey by bus from Beijing to the nearest Hebei Internet bar in the town of Yan Jiao is around 60 km, with car-owning Netizens being able to make the journey in less than an hour along the expressway. The town boasts a "Internet Bar Street," charging patrons around RMB 3 (USD 0.36) per hour. The paper said that the players were mostly from Beijing, and spoke of using their pocket money to make the trip out to Yan Jiao. The internet bars provide users with cheap food and refreshments, meaning users can stay in the bars for long hours.

Very few Internet bars have re-opened in Beijing following a crack down following a tragic fire in June. McDonalds restaurants has started offering limited free Internet access to some of its patrons, but the majority of the city's young Netizens who do not own their own PC have had their Internet access seriously curtailed. Authorities in large Chinese cities such as Beijing and Shanghai pay close attention to Internet bars, and any found to have underage users face swift action. Video game arcades have similarly been shut down, as the majority of their patrons are of school age.

The Internet bar rectification campaign is expected to end on October 1, with bars being allowed to re-apply for business licenses during September.

WIRELESS TECHNOLOGIES

Huawei Technologies and Ericsson conclude patent license agreement on WCDMA/UMTS

World's telecom giant Ericsson announced to Interfax that it has concluded a worldwide patent license agreement with Shenzhen-based Huawei Technologies, a leading Chinese vendor for communications equipment and network solutions for telecom carriers in fixed, mobile and data communications networks.

Under the worldwide royalty-bearing agreement, Ericsson grants Huawei Technologies a non-exclusive, non-transferable **license under** Ericsson's patent portfolio for the WCDMA/UMTS mobile telephony standard. This allows Huawei Technologies to develop, manufacture and sell infrastructure as well as subscriber equipment using the mobile technology from Ericsson. In return, Huawei Technologies will pay on-going royalty payments, as well as providing a reciprocal license to Ericsson.

"This agreement further demonstrates Ericsson's commitment to fully support, and cooperate with local Chinese vendors in order to accelerate the development of 3G mobile telephony and facilitate the market growth in China," said Torbjorn Nilsson, senior vice president of Marketing and Strategic Business Development under Ericsson. "Ericsson is promoting 3G in China and is showing the way to the rest of the industry by granting a **license under** terms to encourage competitive accumulated royalty rate for WCDMA. The agreement with Huawei Technologies will create new opportunities for both the local Chinese industry and Ericsson," he added.

WIRELESS TECHNOLOGIES

Beijing Unicom approved to launch public mobile phone service

The monopoly of Beijing Communications, a regional subsidiary of China's second-largest fixed-line telecom carrier China Netcom, is facing a challenge from Beijing Unicom, which has been given the approval to launch a public mobile phone service in the city. In addition, with the development of Unicom's network, the company plans to turn the public mobile phone apparatus into a mobile data terminal, providing not only voice service, but also other value-added services such as SMS and Internet browsing.

Beijing Unicom's public mobile phone apparatus has the same external shape with common payphones. The only difference is that there is a special mobile phone installed in the public mobile phone apparatus, and the telephone booth is connected to the network wirelessly. The public mobile

phone will have an 11-digit number, just like a normal mobile phone, according to Beijing Yule Xinbao.

Despite the popularity of private mobile phones, and the improvement in fixed-line telephone penetration, the public telephone market is still thought to be of great potential by telecom carriers. A common development strategy for public telephone operators is to upgrade the traditional telephone booth to be an information hub, providing both voice and information services.

Shanghai-listed Wuhan Jinlun Electronics, a major manufacturer of public telephone equipment in China, is promoting its multimedia public telephone apparatus in Shanghai, which is expected to be installed in several large Chinese cities very soon. The multimedia public telephone apparatus can provide Internet browsing, SMS and E-mail services as well as voice service. Trial operations have been completed in Shanghai, Beijing, Wuhan, Nanjing, Guangzhou and Shenzhen, and will start in another 28 cities including Hangzhou and Taiyuan.

An official from Guangzhou Telecom, a subsidiary of China Telecom, said that Internet services in public telephones are still being tested, however, and will be listed as a priority in the company's promotion plan. In addition to the question of the amount of people willing to surf the Internet on the streets, industry insiders are still worried about a high potential rate of equipment damage and expensive maintenance costs.

WIRELESS TECHNOLOGIES

China Unicom announces USD 3.6 mln promotion campaign for its paging service

After a series of mergers and acquisitions of smaller paging companies, China Unicom, the second largest telecom carrier in China, announced a nationwide promotion campaign in a bid to boost its share of the paging market to more than 80% from the current 70%. The company will plough RMB 30 mln (USD 3.6 mln) into the promotion, which will be used to fund premiums to new paging subscribers and to old users that continue their subscription.

China Unicom has already built the world's largest paging network in China, with 28.8 mln subscribers. To sharpen the competitiveness of its paging service, and stop the declining trend due to the popularity of mobile communications, the company announced new brand, New Info, for its paging service. In addition, it is building China's first carrier-class business calling center in a bid to provide more information and value-added services to paging users.

Under the 100-day-long promotion campaign, new paging subscribers of China Unicom and those that continue subscription will be allowed to participate in a lucky draw, reported Qianlong Xinwen Wang. Also, users that promise to subscribe to China Unicom's paging service for 3 years will be able to obtain a CDMA mobile phone from the company for free. Through the promotion, China Unicom has a sales revenue target of RMB 3 bln (USD 362 mln) for this year.

WIRELESS TECHNOLOGIES

Dopod Communications launches Windows operating system-equipped mobile phone

China's Dopod Communications Corp. released a new mobile phone in Beijing on August 22, which is equipped with the Microsoft's Pocket PC 2002 Phone Edition operating system and Intel chip. The company said that the new model, dopod 686, actually is a Chinese-language mobile multimedia terminal with strong wireless communications capability, and is the first such Windows-equipped mobile phone in the world.

Dopod 686 is priced at RMB 7,880 (USD 951.7), much more expensive than a common GPRS mobile phone or CDMA mobile phone. At the launch ceremony, Dopod Communications signed distribution agreements with 10 sales agents, reported Guigu Dongli. Yang Xingping, general manager of Dopod, said that his company expects sales volume of at least 200,000 units this year.

Dopod 686 is also the first mobile phone product Dopod has released

since its establishment. The company will launch more new models this October, which will have blue-tooth functions or have bigger internal memory capacity. In addition, Dopod plans to launch its Smartphone in the near future, which will be more advanced than the dopod 686.

Dopod Communications was set up by China Electronics Corp. and Chinese graduates returned from overseas universities, headed by Dr. Yang Xingping. The company has focused on development of a mobile communications platform that combines voice, information and mobile multimedia terminals together. Based in Shanghai, Dopod has production facilities in Wuhan, capital of central China's Hubei Province.

WIRELESS TECHNOLOGIES

Popularity of mobile phones leads to rise in thefts and smuggling

The popularity of mobile phones in China has not only brought great opportunities to handset producers and mobile carriers, but also a series of problems, including mobile phone smuggling and rising handset thefts. Shanghai Public Security Bureau (PSB) said on August 21 that mobile phone thefts constituted about 56% of all stolen property in the city last year, and women are by far the biggest victims of street theft and robberies.

Most smuggled mobile phones are famous brands, including Motorola, Nokia and Ericsson. To tell the difference between smuggled handsets and non-smuggled ones, users simply need to input "*#06#" into their mobile phones, which then will display a 15-digit IEMI code on the handset screen. The 7th and 8th numbers of the IEMI code indicates where the mobile phones are produced, according to Beijing Qingnian Bao.

For Motorola mobile phones, 06, 07 or 08 stands for Germany, 18 for Singapore, 40, 41 or 44 for the U.K., 67 or 68 for the U.S., 80 or 81 for China, and 92 or 93 for China's Hangzhou. Mobile phones that are assembled in Hong Kong or some East Asian countries will have a number of 47 while those assembled in China have the number 48. For Nokia handsets, 10 represents Finland, 20 Germany, and 30 South Korea. For Ericsson, 19 represents the U.K. and 51 represents Sweden.

In related news, Beijing Health Bureau released an urgent notice recently, banning the use of mobile phones by doctors when they are at work, and in some sections of hospitals, especially operating rooms. Apart from the fact that that making mobile phone calls will reduce the working efficiency of doctors, officials of Beijing Health Bureau also quoted the latest research from Japan that says mobile phone radiation will interfere with the operation of 66.1% of medical instruments. The most serious interference will cause the instrument to break down, threatening the health of patients.

WIRELESS TECHNOLOGIES

Cadence partners with Datang Mobile to develop standards-based solutions for 3G developers

New York-listed Cadence Design Systems, a leading supplier of electronic design technologies, methodology services, and design services, announced to Interfax that it has entered into a collaborative agreement with the Beijing-based Datang Mobile Communications Equipment Co. to jointly develop standards-based solutions. The solutions will be used to help 3G mobile technologies developers in China accelerate time to market for mobile communications products.

As a result of the cooperation, the two companies have already developed the first solution, a base-band library, to fuse Datang's up-link and down-link simulation models with the Cadence Signal Processing Worksystem (SPW). The Datang TD-SCDMA User Equipment R&D Center is recommending the SPW-based TD-SCDMA library models Datang has been developing, and will leverage the Cadence tool chain with SPW, NC-Sim and other design and verification products to develop a TD-SCDMA platform prototype this year. Datang and Cadence are working together to accelerate the adoption of the standard throughout the world market.

The SPW system-design product uses a hierarchical block diagram approach to accelerate the design and development of complex, algorithm-intensive **digital** signal processing (DSP) systems.

Part of the Cadence wireless solution flow, SPW is the only electronic design automation (EDA) solution for signal processing that provides a fully integrated, streamlined solution from algorithm design to implementation on multi-ASIC/FPGA systems and systems-on-a-chip (SoCs), including next-generation nanometer designs.

"By extending the TD-SCDMA standard's reach globally, through the integration of our simulation chains with the Cadence SPW platform, among others, we intend to help many additional users speed R&D development and reduce time to market," said Yang Guiliang, general manager of New Technology Department under Datang Mobile Communications. "We expect the integration will result in widespread adoption of the TD-SCDMA standard," he added.

WIRELESS TECHNOLOGIES

BitRage and CGT to jointly deliver high-speed broadband wireless solutions in China

BitRage, a developer of **Digital** Signal Processor (DSP), Radio Frequency (RF) and Unshielded Twisted Pair (UTP) technology, announced to Interfax that it has entered into a manufacturing and distribution strategic alliance with Wuhan-based Central Global Telecom (CGT), a provider of communications equipment in China. Through the strategic alliance, CGT will deliver BitRage's high-speed broadband wireless solutions to telecom carriers and private businesses throughout China. In addition, it will be enabled to provide improved network capabilities, high reliability, and greater bandwidth to its customers.

The agreement between BitRage and CGT came as a result of a joint demonstration of BitRage's new 5.8 GHz, 100 Mbps point-to-point radio at the MegaPort-100 Symposium held in Wuhan early this month. BitRage claims that it is the first company in China to introduce a MegaPort technology product using the 5.8 GHz frequency. BitRage expects its new 5.8 GHz radio to receive regulatory certification from the radio management bureau under the Ministry of Information Industry (MII) by this autumn. It anticipates that significant sales will be realized during the first year of introduction of its 5.8 GHz radio under the agreement with the CGT.

Jim Dionne, CEO of BitRage, said that the strategic alliance combines BitRage's leadership in designing wireless technology with CGT's strength in marketing innovative network solutions to the growing China marketplace. CGT is focused on developing the broadband access market in China and growing the overall communications infrastructure through alliances with innovative developers of leading edge technology.

HARDWARE

China becomes world's fourth largest manufacturing country - Great Wall Strategic Research

China has become the fourth largest manufacturing country in the world, ranking first in the output of more than 100 varieties of goods, according to a "Science-tech Creation and Made in China" survey conducted by the Great Wall Strategic Research Institution for Enterprises. The 100-plus varieties of products cover more than 10 fields of manufacturing industry including household electric appliances, communications equipment, textiles, medicine and pharmaceuticals, mechanical devices and chemical industrial products.

Of the household appliance sector, China produced 39.36 mln color TV sets in 2001, accounting for 29% of the world's total output, reported Renmin Ribao. Output of washing machines, refrigerators, and air-conditioners last year were 14.43 mln, 12.79 mln and 18.27 mln, respectively, about 24%, 16% and 30% of the world's total output. Annual output of electric fans and cameras reached 76.61 mln and 55.14 mln, representing more than 50% of the world's total.

In electronic devices and communications equipment sectors, China turned out 95.98 mln telephone sets last year, taking up 50% of world output, while production of displays reached 45.90 mln, 42% of the world's total. Production volume of clocks and watches reached some 150,000 sets, 75% of the world's total.

Great market potential and comparatively lower labor costs are attracting more foreign firms to set up their production facilities in China. Since the 1990's, investment of RMB 230 bln (USD 27.8 bln) from foreign firms in China, took up approximately 45% of the total foreign investment in Asia. Multinationals like Microsoft, Motorola, Samsung and GE established more than 100 research and development centers, and higher numbers of production bases in China.

HARDWARE

Samsung to set up laptop PC production base in China, following Toshiba

South Korea's Samsung Electronics is planning to set up a laptop PC production base in China within this year, in a bid to raise the company's production capacity and realize its target to become one of world's top 5 laptop PC producers by 2005. Planned annual production capacity of Samsung laptop PC base will be 500,000 units. Candidate locations of the base include Shanghai, Suzhou and Tianjin.

A report by Beijing Qingnian Bao said that Samsung intends to locate its laptop PC production base in Suzhou, a medium-sized city in eastern China's Jiangsu Province. The city has already become home to several big laptop PC OEM manufactures, with total production capacity of more than 10 mln units every year. However, CCIDNet said that Samsung is now more interested in Tianjin, instead of Suzhou. Samsung's laptop PC production base is expected to commence operation next year.

Besides Samsung, world's leading laptop PC vendor Toshiba also announced its second laptop PC production site in China. With registered capital of JPY 550 mln (USD 4.58 mln), the new plant, located in Zhejiang Hangzhou Export Processing Zone with land of 400,000 sq m, will commence operation next April. Planned production capacity of the plant will be 750,000 units in fiscal year of 2003, with 1,700 employees.

Toshiba told Interfax that the second plant will reinforce its global logistics and product competitiveness by shortening time-to-market for Toshiba PCs, and also reinforce its position in the Chinese market for laptop PCs. The company will extend use of the new site to cover production of components, product assembly in due course, and will gradually create an integrated IT production complex serving the global IT market.

The first China laptop PC production base of Toshiba is located in Shanghai. The plant, named Toshiba Computer Systems (Shanghai) Co., started production in 2000.

HARDWARE

GSMC places multimillion U.S. Dollar order to Asyst for SMIF-based isolation products

NASDAQ-listed Asyst Technologies, a leading provider of integrated automation solutions that maximize the productivity of semiconductor manufacturing, announced to Interfax that it has been awarded a contract worth several million U.S. Dollars by Shanghai-based Grace Semiconductor Manufacturing Corp. (GSMC), a major semiconductor foundry in China.

Asyst is a leading provider to China of standard mechanical interface (SMIF)-based isolation products for semiconductor-manufacturing automation. Because GSMC is expected to accept equipment in phases over the next 18 months, Asyst said that it will only book a portion of the order in its current fiscal quarter ending September 30, 2002, with the remainder booked in subsequent quarters.

Asyst supplies 200 mm wafer isolation (SMIF) and wafer-lot tracking technology, with an estimated market share in excess of 80% worldwide. In the foundry market, Asyst shipped its first SMIF products to a major Taiwanese foundry in 1989, and since that time, essentially every major foundry in the world has adopted the company's technology. Early this year, the company received its first order from China for the first China-based fabrication established by a major North American microelectronics manufacturer.

HARDWARE

ViewSonic aims to become China's largest PC monitor provider by 2004

ViewSonic, the largest PC monitor producer in the United States, announced its expansion plan for China, revealing the company aims to become the largest monitor supplier in mainland China by 2004. The company has already set up its Mainland headquarters in Shanghai and is planning establishment of an R&D center in the city to develop software used in ViewSonic LCDs (liquid crystal displays) and future wireless displays.

China will soon become the most important market of ViewSonic in Asia, although it was not a top priority when the company first entered the mainland China market in 1999, said James Chu, chairman and CEO of ViewSonic, who visited Shanghai last week. "We will offer the domestic market high-quality products, although they will be a little more expensive than the products of existing brands. We believe Chinese customers will trade price for performance," said Chu.

ViewSonic predicts that the demand for flat-screen displays in China will soar while production costs decline over the next few months. The company expects its LCD sales in China to grow by 70%, reported Shanghai Ribao. Chu said that ViewSonic will invest heavily on R&D as well as marketing campaigns in China in the second half of this year. "It is reasonable for ViewSonic to begin a considerable marketing campaign at this time, as the price of LCDs will decline in the later half of this year due to more stable and sufficient panel supply," said Chen Gong of Samsung Electronics.

HARDWARE

NCR Corp. announces USD 20 mln ATM contract with Bank of China
NCR Corp., a leading financial equipment and technologies provider, announced to Interfax that it has been awarded a contract worth USD 20 mln by Bank of China, one of the four largest State-owned commercial banks in China. Under the agreement, NCR will provide Bank of China with Personas 86, Personas 84, Personas 74 and Personas 75 automated teller machines (ATMs) with enhanced self-service functions.

The new ATMs will be deployed in branches all over China. Bank of China already has over 6,000 ATMs, and the intention is to add multiple units to its 13,000 points of service. The move aims to further enhance the bank's service network and ensure quick and convenient service to its customers. The scalability of the Personas A Bank of China to further develop its self-service offer, including advertising and Mobile-commerce on ATMs.

Bank of China has a long-standing relationship with NCR, which helped the bank install China's very first online ATM in 1988 at the bank's Shenzhen branch. Albert Tsang, vice president of NCR Financial Solutions division, anticipates that an expanding demand for self-service solutions will emerge in China in the near future.

HARDWARE

Siemens secures 7 orders for electrical drives and automation systems in China's paper industry

Siemens China, a wholly owned subsidiary of Siemens Industrial Solutions and Services Group (I&S), announced to Interfax that it has secured 7 orders worth EUR 7.8 mln (USD 7.69 mln) for electrical drives, power-supply systems and automation equipment in China's paper industry. In all these projects, Siemens will be responsible for basic and detailed engineering as well as for commissioning the equipment and for training the personnel.

These 7 orders came from Shandong Bohui Industry Co., Shandong Taishan Paper Mill, Shandong Tralin Paper Co., Jiangsu Minfeng Special Paper Co., Heilongjiang Mudanjiang Hengfeng Paper Co., Baoding Banknote Paper Mill and Jiangsu Wuxi Longchen Paper Co.

Among the 7 orders, Siemens will provide its new automation system based the PCS 7 process control system. In addition, it will supply variable-speed drives with the associated Simovert Masterdrive converters for a total of 7 paper machines. These drives are characterized by their maximum power output, dynamic performance and outstanding speed precision even at the lowest speeds. The total output stipulated by the orders

amounts to around 34 000 kw.

The largest single project is for Shandong Bohui Industry Co. in east China's Shandong Province. Siemens will provide PCS 7 process control system to the company, which is now building a new production line for manufacturing 200,000 metric tons of cardboard and paperboard per year. In addition, Siemens will offer sectional drives for new production lines to Shandong Taishan Paper Mill and Shandong Tralin Paper Co.

HARDWARE

Mattson Technology announces China operation with new office in Shanghai

NASDAQ-listed Mattson Technology, a leading supplier of advanced process equipment used to manufacture semiconductors, announced to Interfax that it has opened a new office in China, representing the start of the company's operation in China. The new Shanghai facility expands the company's support infrastructure in Asia and will provide customers direct access to Mattson's product and service solutions in China.

Mattson Technology has long held a leadership position in the Asia-Pacific region, with a strong local presence in Taiwan, Japan, Korea and Singapore. Its new Shanghai office is located in Jinqiao, Pudong, about two miles from Zhangjiang Hi-Tech Park where China's major fabrications are situated. The new office will be used to provide round-clock technical support services, product training, equipment and applications expertise and spare parts logistics. The facility will also serve as Mattson's central administration, sales and marketing office in China.

"With a growing number of wafer fabrications, China is quickly becoming a regional leader and a driving force in the global semiconductor industry, and Mattson has strategically positioned our new office in Shanghai to serve this burgeoning market," said David L. Dutton, president of Mattson Technology. "With links to Mattson offices in the Asia-Pacific region, the new facility will expand our capability to provide industry-leading technology solutions and enhanced system service and support to our customers in China," added Mike Morita, executive vice president of Global Business Operations for Mattson Technology.

HARDWARE

Telenetics and FIBROTEC to jointly market data communications products in China

Telenetics Corp. a producer of wired and wireless data communications products, announced to Interfax that it has entered an agreement with Hong Kong-based FIBROTEC Ltd., to be its representative and distribution agent for all of mainland China and Hong Kong. FIBROTEC plans to set up sales facilities in Beijing as well as other growth regions in China.

The agreement follows a recent extensive and targeted market survey conducted by Telenetics' senior sales and marketing staff in China. The survey confirmed substantial opportunities in the application of Telenetics' data communications products and systems in areas such as remote monitoring communications including Automated Meter Reading (AMR), Traffic Communications, as well as continuing market for the Sunrise Products acquired from Motorola's MND Division last year.

Telenetics Sunrise Series (formerly Motorola) of analog modem products is among the most efficient and reliable products of their type ever introduced into China. said Willy Leung, head of FIBROTEC and former director of market development for the Asia-Pacific region of Motorola's MDN Division. He estimated that the quantity of commercial modems purchased annually in China to be as much as 100,000 units

The relationship with FIBROTEC provides the key requirement of on-site representation, which provides Telenetics access to the leading communications distributors and system integrators that formerly represented and sold the Motorola products throughout China. These distributors have confirmed an interest in Telenetics' wide variety of wireless communications devices and radios, the industrial grade modem series, fiber optic and microwave products, as well as the Sunrise modems

product line.

These distributors represent expertise and experience with applications in banking, military, transportation, utility automation, oil and gas distribution and telephone companies. Their distribution network has sub-channels that include thousands of individual resellers, covering every province in China.

HARDWARE

Beijing Planetarium to install world's first all-laser solution from Silicon Graphics

New York listed Silicon Graphics Inc. (SGI) announced to Interfax that it has been contracted by the Beijing Planetarium, in its biggest China contract to date, to install an SGI Onyx visualization system connected to Zeiss Laser All-Dome projectors. The graphics supercomputing system will be the cornerstone of a new planetarium planned for installation at the institution, founded in 1957. The financial details of the contract were not released.

According to the company SGI's real-time graphics will allow users to navigate through huge science **data** sets, creating a **different** show for each performance, if desired. In this first-ever all-laser dome installation in the world, audiences will be able to enjoy an immersive, entertaining and educational experience.

SGI's **digital** planetarium solution offers laser projection, and high-end graphics including very-high-resolution real-time 3D graphics.

SOFTWARE

Kingdee moves into China's auto industry to provide ERP software to FAW and Shenyang Jinbei

Hong Kong's Growth Enterprises Market (GEM)-listed Kingdee International, a leading financial software developer in China, is making inroads into China's automobile industry. The company told Interfax that it has entered into an agreement with China's largest automobile maker FAW Group on deployment of Kingdee's TEEMS (Total Enterprise Management Solutions). In addition, it has awarded a contract by Shenyang Jinbei Car Manufacturing Co. to provide its ERP (enterprise resources planning) software, K/3 system.

Under the agreement with FAW Group, FAW Trading General Co., a subsidiary of FAW Group, will implement TEEMS, the next generation of E-Business system of Kingdee. The move aims to strengthen its E-collaboration among staff, with business partners and with customers, and sharpen the company's overall competitiveness. FAW Trading General Co. is mainly engaged in the sales and after-services of heavy trucks and the parts of Jiefang trucks produced by FAW Group.

TEEMS system is a high-end ERP software targeting complicated business process of large businesses and E-Business management. Equipped with TEEMS system, FAW Trading General Co. can not only realize inner E-Business, management innovation and business optimization, but also establish E-Commerce system with suppliers, customers and partners. Beijing Case Software Corp., recently acquired by Kingdee, will be responsible for the implementation of the project.

Shenyang Jinbei Car Manufacturing Co. is a joint venture of Brilliance China Auto Holdings and Shenyang Jinbei Auto Co. Kingdee's K/3 ERP system will help the company build enterprise informatization platform. Kingdee K/3 ERP will manage the logistic flow and capital flow of the company, streamline its production process, and offers enterprise management and decision-making support.

SOFTWARE

SCM Microsystems provides secure broadcast decryption technology to China's DTVIA

NASDAQ-listed SCM Microsystems, a leading provider of **Digital** TV solutions, announced that it has entered into agreement with DTVIA Conditional Access System (ChinaCrypt) Co. to provide its secure broadcast decryption technology. The Beijing-based DTVIA, a

joint venture between Beijing DTVIA (**Digital** TV Industry Alliance) Investment and Philips Electronics China, provides conditional access systems to Chinese's **digital** TV market.

Under the agreement, SCM Microsystems will provide DTVIA with open standards-based conditional access modules (CAMs) and the software development kit to enable DTVIA to port its conditional access software onto the modules. The resulting ChinaCrypt CAMs will help DTVIA tap an abundance of set-top boxes that already have a Common Interface slot installed.

The joint collaboration is expected to help DTVIA consolidate its position in the local and international **digital** TV broadcast industry and to augment SCM's range of CAMs for the pay TV and content protection industry. The ChinaCrypt CAM, which complies with the DVB Common Interface (CI) standard, will make its debut at the upcoming International DTV Operation and Technology Conference 2002 held in Beijing.

There are more than 1,300 cable broadcast stations and more than 4,000 cable TV providers in China, according to official figures. The National **Digital** Network backbone with nationwide coverage envisions a cable TV subscriber base of 127 mln by 2005, equivalent to 28.5% of TV households in the world. A trial operation of **digital** TV is currently under way in Beijing.

SOFTWARE

Clarent signs strategic distributor agreement with ChinaWeal

Clarent Corp., a leading provider of IP softswitch and enterprise convergence solutions for next generation networks, announced to Interfax that it has entered into a strategic distributor agreement with ChinaWeal, a leading IT service provider in China. The partnership is expected to enable companies that deploy Clarent networks to leverage ChinaWeal's support infrastructure, system integration capabilities and in-house software development expertise.

Under the agreement, ChinaWeal's technical staff will provide around-the-clock Tier 1 and Tier 2 support, partial Tier 3 support, onsite resources and training instructors for Clarent solutions. The company will also provide system integration service to customers, including specialized expertise with the highly complex billing and subscriber management systems of local telecom carriers. In addition, ChinaWeal's in-house team of more than 200 software engineers will be available to support the accelerated development of customized applications that can be integrated with the Clarent softswitch platform.

ChinaWeal has purchased Clarent's enterprise-focused NetPerformer EG gateways to connect offices in Beijing, Shanghai, and Chengdu. In addition to providing measurable cost-savings by minimizing the bandwidth requirements of voice, data and fax applications, the deployment of Clarent's integrated access devices will allow ChinaWeal to demonstrate the flexibility and reliability of these solutions in a real-world setting. ChinaWeal intends to build a demonstration network that integrates NetPerformer EG with Clarent's fully distributed Edge Access (Class 5) Softswitch and PSTN Access (Class 4) Softswitch solutions, which include Clarent Command Center, Class 5 Call Manager and Class 4 Call Manager software plus Clarent BHG 1000 media gateways.

COMPANY FINANCIALS

TCL Communications sees interim revenue up 378% to USD 420 mln, profit soars to USD 13.7 mln

Shenzhen-listed TCL Communications Equipment Corp. announced to Interfax that its sales revenue surged by 378.74% year on year to RMB 3.477 bln (USD 420 mln) in the first half of this year, mainly because of hot sales of TCL mobile phones. Net profit of the company soared to RMB 113.34 mln (USD 13.69 mln), 15.7 times more than the RMB 6.78 mln (USD 818,800) recorded in the same period of 2001.

Key operational figures of TCL Communication Equipment Corp. for the first half of 2002

Source: TCL Communication Equipment Corp.

TCL Mobile, 36% held by TCL Communication Equipment Corp., was major revenue and profit contributor to the company. Among total revenue of TCL Communication Equipment, 93.23% came from mobile phone sales, which went up more than 4 times to RMB 3.24 bln (USD 391 mln) during the period. Sales of fixed-line telephone apparatuses generated 6.09% of the company's total revenue, while remaining 0.68% revenue came from lithium batteries.

COMPANY FINANCIALS

ZTE sees revenue up 12% while profit down 27% in 1H, dual-listing plan approved by shareholders

Shenzhen-listed Zhongxing Telecom Equipment Corp. (ZTE Corp.), a leading telecom equipment manufacturer in China, announced to Interfax that it achieved sales revenue of RMB 3.97 bln (USD 479 mln) in the first half of this year, 12.12% up from the RMB 3.54 bln (USD 427.5 mln) one year ago. Operating profit of the company increased by 12.1% year on year to RMB 1.51 bln (USD 182 mln) during the period. However, due to a significant rise in operating and sales expenses, as well as R&D expenses, net profit of ZTE Corp. dropped by 27.03% year on year to mere RMB 134 mln (USD 16.2 mln).

Key operational figures of ZTE Corp. for the first half of 2002

Source: ZTE Corp.

Despite a substantial increase in operating cash flow, which surged by 149% year on year to reach RMB 0.715 (USD 0.086) per share, cash and cash equivalent reserve of ZTE corp. saw a sharp decrease of 86.75% to only RMB 247 mln (USD 29.8 mln) during the period. This compared to the RMB 1.87 bln (USD 226 mln) recorded one year ago. To finance its further development in 3G mobile technologies, ZTE has decided to go public on Hong Kong Stock Exchange.

Although the dual listing plan of ZTE Corp. was widely objected by small and some institutional shareholders, the shareholders' meeting on August 20 still passed the company's proposal to issue H-shares in Hong Kong late this year, or early next year. H-shares to be issued will account 30% of the company's share capital at most. Through H-share offering, ZTE aims to raise at least USD 450 mln.

COMPANY FINANCIALS

Nanjing Panda sees interim revenue sharply down after Ericsson leaves its handset JV

Ericsson announced to Interfax that it has completed sales of its stakes to Microcell in the joint venture with Nanjing Panda Electronics. The joint venture has already changed its name to Nanjing Microcell Panda Mobile Terminals from former Ericsson Panda Mobile Terminals Co. (EPC). Due to the restructuring of EPC, Panda Electronics, listed in both Shanghai and Hong Kong, suffered a substantial drop in sales revenue and net profit in the first half of this year.

Nanjing Panda Electronics told Interfax that its sales revenue plunged by 41.87% year on year to RMB 329 mln (USD 39.7 mln) in the first half of this year, while its net profit fell by an even higher percentage, 74.36%, to RMB 20.29 mln (USD 2.45 mln). Because of the withdrawal of Ericsson, EPC, 35% held by Panda Electronics, which mainly produces Ericsson-branded mobile phones, suffered a loss of RMB 25.42 mln (USD 3 mln) during the period, with sales revenue sharp down by 25.1% to RMB 731 mln (USD 88.3 mln). EPC produced 752,000 mobile phones in the first 6 months of this year, 42.4% less than that in the same period of last year. All the figures were calculated under Chinese accounting rules.

Ericsson told Interfax that its withdrawal from the EPC would enable the company to streamline its production facilities and enable a more efficient utilization of resources through only one facility focusing on mobile phone manufacturing in Beijing. However, Christine Zhang, spokeswoman of Sony Ericsson Mobile Communications (China) Co., told Interfax that her company would soon acquire a majority stake in Ericsson's Beijing facility to produce Sony Ericsson mobile phones. Sony Ericsson, the mobile phone joint venture between Sony and Ericsson, announced full-scale China operations last week.

Ericsson currently still has a joint venture with Nanjing Panda Electronics in Nanjing, which mainly produces mobile communications systems and equipment. The joint venture, Nanjing Ericsson Panda Communications Corp. (ENC), recorded sales revenue of RMB 3.189 bln (USD 385 mln) in the first half of this year, down 47.25% year on year. Its net profit also saw a substantial drop of 53.47% to RMB 134 mln (USD 16.2 mln). ENC currently is one of 4 global supply centers of Ericsson.

COMPANY FINANCIALS

Ningbo Bird posts revenue of USD 266 mln in 1H, plans joint venture with SAGEM

Shanghai-listed Ningbo Bird, a leading mobile phone producer in China, announced to Interfax that its sales revenue surged by 79.18% year on year to RMB 2.2 bln (USD 266 mln) in the first half of this year, with net profit more than doubled, 102.15%, to RMB 56.3 mln (USD 6.8 mln). The outstanding performance of the company was mainly because of the booming sales of its mobile phones on domestic market.

Key operational figures of Ningbo Bird for the first half of 2002

Source: Ningbo Bird

Among total revenue of the company, 99.07% came from mobile phone sales, 0.42% from paging machines while 0.45% from sales of silicon batteries. In a bid to further expand its share on mobile phone market, Ningbo Bird will set up a mobile phone joint venture with France's SAGEM in the second half of this year. Related agreement has not been signed. With the establishment of the joint venture, production capacity of Bird mobile phones will be boosted to more than 10 mln units.

COMPANY FINANCIALS

Jade Bird Universal to raise USD 20.3 mln through issuing 140 mln new shares late September

Beida Jade Bird Universal Science and Technology Co., a leading developer of embedded systems, is planning to issue an additional 140 mln H-shares on Hong Kong's Growth Enterprises Market (GEM) by the end of September. The proceeds from the new share offering will be used to finance its acquisition of 5.29% shares in Shanghai-based Semiconductor Manufacturing International Corp. (SMIC), a major semiconductor foundry in China.

Established in April, 2000 with total investment of USD 1.48 bln, SMIC is the first company in China that put 8-inch IC chips into volume production. The company raised USD 1 bln last September in a new round of fund-raising, in which, Beida Jade Bird Universal acquired a 5.29% stake in that company for USD 60 mln. The first part of the consideration, USD 45 mln, was paid last September, while the remaining USD 15 mln was paid this June.

Due to its comparatively small asset value, which is less than RMB 400 mln (USD 48 mln), Jade Bird Universal applied for a short-term loan of RMB 390 mln (USD 47.1 mln) to finance its acquisition. Jade Bird Universal plans to issue 140 mln new shares at HKD 1.2 (USD 0.154), targeting proceeds of RMB 168 mln (USD 20.3 mln). The company denied that it was considering to lower the issuing price, although its share price on Hong Kong's GEM had already dropped to HKD 1.1 (USD 0.133), reported Guoji Jinrong Bao.

SMIC commenced operation this January with a designed monthly production capacity of 42,000 IC chips. As scheduled, the monthly production capacity will be expanded to 30,000 chips by the end of this year. Jade Bird Universal expects that its investment in SMIC would contribute profit to the company next year. In addition, because SMIC is planning a listing on either the NASDAQ or Hong Kong stock market by the end of next year, Jade Bird Universal believes that the value of its investment in SMIC will at least double after the event.

COMPANY FINANCIALS

Kingdee sees interim revenue up 52.4% to USD 16.2 mln and net profit up 30% to USD 1.58 mln

Hong Kong's Growth Enterprises Market (GEM)-listed Kingdee

International, a leading ERP (enterprise resources planning) software developer in China, announced to Interfax that it recorded sales revenue of RMB 134 mln (USD 16.2 mln) in the first half of this year, up 52.4% year on year. Net profit of the company soared 30.0% to approximately RMB 13.1 mln (USD 1.58 mln) from one year ago.

Products of Kingdee International secured a 15.4% market share and topped among the ERP software brands in China, according to Computer Market Research Center (CCW Research). In China's financial industry, software from Kingdee International outperformed its counterparts to top the list with a 24.7% market share.

Kingdee International announced its new strategy this year to focus on the development of application software for different industries. Besides contracts in the financial and tobacco industries, the company entered into sales agreements with many big enterprises and organizations in China in the first half of this year, such as Jiangxi Coal Group, Shenzhen 999 Sophisticated Chemical, Heilongjiang Power, and Jiangsu Telecom. Through acquisition of Shanghai Case Software Technology Co., Kingdee expanded its total solutions to knowledge management solutions and commercial intelligence solutions.

In related news, Kingdee Software (China) Co., a subsidiary of Kingdee International, told Interfax that it has entered an agreement with Microsoft (China) Co. to jointly develop an application solution based on Microsoft's .NET strategy. Under the agreement, Kingdee selected Microsoft's SQL Server as its large-scale database solution for database management technologies. Kingdee's K/3 system is an application system that can be transplanted to Windows 2000 and SQL Server 2000. The system, based on Microsoft .NET technologies, includes human resource management, performance management, salary management, training and development, and employee services.

STOCK MARKET

IT & Telecom shares market overview

A-Share markets of Shanghai and Shenzhen rallied this week on a technical rebound helped by the buying of bank and IT shares. Shanghai Composite Index closed 1683.20, 2.21% or 36.41 points up while Shenzhen Composite Index rose by 2.01%, or 9.76 points, to end at 495.66. Turnovers of both bourses expanded significantly and market sentiment is gradually warming up.

Four listed banks in Shanghai and Shenzhen found market favor this week because investors were encouraged by their good interim results and the possibility of cooperative pacts between Chinese and foreign banks. Citibank was reported to be seeking a stake in Shanghai Pudong Development Bank (SPDB) through a share acquisition from the Shanghai government and another State-owned company under Shanghai government. Shanghai Pudong Development Bank did not deny the report in a statement, but was not willing to disclose more details.

A wave of buying in bank shares was aroused upon the news, because investors hoped that such a deal would also happen on other listed banks, including Shenzhen Development Bank, China Minsheng Bank and China Merchants Bank. A simple reason behind the popularity of bank shares is that some institutional investors hope to use the Citibank-SPDB deal to boost the market, thus reversing the falling trend on the current sluggish stock markets.

Strong buying was extended to hi-tech shares later this week, partly because of the bounce up of the NASDAQ market. Although interim results of IT companies failed to show their high growth in the first half of this year, investors believed that the operation of IT companies will be better in the second half of this year, due to a predicted recovery of telecom infrastructure investment.

Market sentiment was also bolstered by several market expectations. Information from China Securities Regulatory Commission said that the research of a QFII (qualified foreign institutional investor) system has been accelerated, implying that the launch would be earlier than expected.

In addition, central bank officials disclosed this week that individual investors would be allowed to mortgage their stocks to banks for loans late this year. Both policies, if come to fruition, will bring fresh capital to stock markets, thus leading to a rising demand for shares.

Technically, both Shanghai and Shenzhen managed to jump out of their lower levels this week. However, whether the rebound can continue will depend on follow-through buying, suggested Interfax stock analysts. If fresh capital can continue to flow into the markets, both bourses are expected to gain rises next week.

B-Share markets of Shanghai and Shenzhen inched up this week because of the rebound of their A-share counterparts. Shanghai B-share Index closed 0.79% or 1.20 points up to 152.23 while Shenzhen B-share Index ended 1.10%, or 2.68 points higher to 245.91. Turnovers of both bourses increased slightly amid a cautious market sentiment.

The Ministry of Foreign Trade and Economic Cooperation (MOFTEC) announced new rules this week that will allow foreign investors to sell their "non-tradable" B shares. B-shares can be bought and sold by both foreign and domestic individuals, but the new regulation affects those foreign joint-venture partners who received the shares as a token of their investment, and were not permitted to sell them on. There are conditions, however. The company must have made profits for two consecutive years, and once the investor has received approval, there is still a year wait before the shares can be disposed.

Analysts from Beijing Securities said that the conditions are aimed at slowing the departure of foreign investors from the B-share markets, thus should be a positive boost to B-share markets. The Chinese government first allowed overseas shareholders to sell their B-shares two years ago. Many foreign partners then withdrew from the USD 13 bln B-share markets, packed with poor-quality firms, which had reported consecutive years of losses. Foreign interest has further waned since the market was opened to retail Chinese investors last February, leading to a tripling of prices in three months.

However, buying remained moderate due to the corporate reporting season that will last until the end of August. Under the current situation, most investors simply took the performance of A-share markets as their guide in trading B-shares. As a result, the B-share market will continue to follow its A-share counterpart next week, suggested Interfax stock analysts.

STOCK MARKET

Indexes for Shanghai and Shenzhen stock exchanges for the weeks of 16-23/08/2002

Shanghai Composite Index is the overall statistic quotation reflecting dynamism of the Shanghai Stock Exchange. The index has been published by the Shanghai Stock Exchange since July 15, 1991. The index basic unit is a "point". December 19, 1990 was chosen to be a benchmark, with 100 points set as the starting day value. In 1992 - 1993, the Shanghai Stock Exchange started issuing supplementary indices to diversify quotations of various securities (A-shares, B-shares and classified indices on diverse sectors of the economy) - the Shanghai Composite Index became a comprehensive complex set of share prices.

Shenzhen Composite Index is the overall statistic quotation reflecting the dynamism of the Shenzhen Stock Exchange. The Shenzhen Stock Exchange (SZSE) has been publishing the index since April 4, 1991. The basic unit of the index is a "point". April 3, 1991 was chosen to be a benchmark, with 100 points set as the starting day value. To diversify quotations of various securities (Shenzhen A-shares, B-shares, and classified indices on diverse sectors of the economy), the Shenzhen Stock Exchange began issuing supplementary indices from October 6, 1994, which made the Shenzhen Composite Index a comprehensive complex set of share prices. From January 23, 1995, SZSE started publishing sub indices (Shenzhen Sub A-shares and Sub B-shares), reflecting the dynamism of 40 main companies. July 20, 1994 was chosen to be a benchmark, with 1,000

points as the starting day value.

STOCK MARKET

Shanghai IT & Telecom A-Shares official quotation for the weeks
of 16-23/08/2002

Source: Shanghai Securities Exchange

STOCK MARKET

Shenzhen IT & Telecom A-Shares official quotation for the weeks
of 16-23/08/2002

Source: Shenzhen Securities Exchange

STOCK MARKET

Shanghai IT & Telecom B-Shares official quotation for the weeks
of 16-23/08/2002

Source: Shanghai Securities Exchange

STOCK MARKET

Shenzhen IT & Telecom B-Shares official quotation for the weeks
of 16-23/08/2002

Source: Shenzhen Securities Exchange

STOCK MARKET

Indexes of Hong Kong stock exchanges for the week of 16-23/08/2002

Source: Stock Exchange of Hong Kong

STOCK MARKET

Hong Kong IT & Telecom Shares for the week of 16-23/08/2002

Source: Stock Exchange of Hong Kong

STOCK MARKET

HK Growth Enterprises Market (GEM) IT & Telecom shares for the
week of 16-23/08/2002

Source: Stock Exchange of Hong Kong

SURVEY

WLAN in China

Shanghai. August 22. INTERFAX-CHINA - True to form, China is again adopting a new technology wholeheartedly - as fiber broadband construction is growing significantly - mostly led by China's coastal cities. But with the arrival of wireless broadband, in the form of Wireless Local Area Networks (WLAN) there has also arrived the phenomena of China leapfrogging itself in the rush to bring a new technology to the masses. It's not yet proven - but the fixed line operators (mostly China Telecom) who operate fiber broadband networks, and investors who are ploughing in the last mile broadband connections to China's homes and offices across the country are not too pleased at the advent of wireless broadband transmitters circumventing their efforts. And China Telecom is planning to compete with the potential threat directly -by setting up its own WLAN networks nationwide.

Currently WLANs are available - for instance Shanghai Jiao Tong University library, Hongqiao Airport, numerous hotels, and some large companies like Intel and Cisco have a WLAN serving their China offices.

IDC predicts a 180 % increase in the WLAN market this year, with an annual growth rate of 70% until 2005. IDC claims Beijing, Shanghai, Wuhan and Guangzhou already have between 30,000 to 40,000 WLAN users each, mostly corporate users.

According to Shanghai Ribao China Netcom has installed more than 20 WLAN transmitters in Shanghai, Beijing, Shenzhen and Guangzhou. The company expressed it will be installing networks in most major cities "as soon as possible."

China Telecom's "secret plan": intends to use WLAN services to compete with wireless operators

Currently recent reports indicate Shanghai has around 40,000 broadband subscribers, with 3.2 mln cable subscribers by the end of 2001, who may now opt to have access to broadband services now that the connections are in place, with many buildings now touting the service to tenants. The city will also see **digital** TV broadcasts and VOIP telephone services by the end of this year according to vice mayor Yan Junqi. But if users will be able to access all these services on wireless

networks- the effort of laying all that cable will have gone to waste. Currently Shanghai Telecom is developing wireless LAN applications with Fudan University, as reported by Interfax.

Guangdong Telecom released news this week that its "Starry Sky 5" fiber broadband service - for its more than 400,000 broadband users and Guangdong's more than 6 mln Internet users. The project is a part of China Telecom's "Starry Sky" plan, which is to interconnect various platforms and services for Internet users nationwide. Especially for game players, or movie downloads and **other** such high memory **content** services suited to broato these efforts by China Telecom to promote its fiber broadband, in a landmark move Fujian Telecom unveiled its wireless LAN card that can be inserted into notebook computers or desk-tops, offering wireless broadband, so long as the user is within 300 m of a transmitter. The high speed broadband transmitter offers users 11 Mbs bandwidth according to Renmin Youdian Bao, (compared to ADSL's 1 Mb) as well as being touted as environmentally friendly - as builders will not have to lay the essential last mile of cable to users. But according to further reports that transmitter bandwidth would be diluted, depending on how many users were logged on to each particular transmitter, but still offers better bandwidth than the traditional ADSL 1 Mb.

Guandong based Nanfang Zhoumo uncovered the darker side of this conflict in China's Southern provinces. Potentially users are now able to log on to a broadband network in conferences, hotels, conventions and exhibition centers, even in tea houses and restaurants, following the Ministry of Information's (MII) requisitioning of a GHZs frequency with the stated intention to support the development of application technologies for wireless LANs. The paper asks is this "minor matter" of reserving the frequency for wireless LAN networks hiding a huge wireless LAN development plan by China Telecom?

As far back as last year wireless broadband access has been available selectively through cards that let users log on through pin word input in Beijing, Shanghai, Shenzhen and Guangzhou. The paper states that China Telecom will begin to "have palpitations" once China Mobile decides to launch GPRS combined with a WLAN wireless data business. As GPRS, or even 3G mobile telephone technology is obviously far too slow to come anywhere near broadband's bandwidth it is predicted that China Mobile users will be able to acquire a WLAN chip, which can automatically detect WLAN frequencies, and log on when in range. Currently Nokia has such a device available, according to the report. Those areas not covered by WLAN will be covered by China Mobiles extensive GPRS network.

Following potential developments such as these the very nature of China's wireless networks will change fundamentally. China Mobile has already carried out pilot schemes in Chongqing and Shanghai in January this year, and a source told the paper that a commercial roll out of this service is expected by the end of this year.

China Telecom has been developing a WLAN plan for some time, but without any official announcements. Last November Guangdong Telecom started testing its "Network Express Train WLAN" in Guangzhou, Shenzhen; Foshan, Shuande, Dongguan, Zhuhai, Huizhou, Zhongshan Zhanjiang and Shantou. Each transmitter could support 20 to 30 users simultaneously, at faster speeds than ADSL. Guangdong Telecom has stated that it hopes the WLAN and fiber broadband networks will complement each other - with the company being able to offer users a "wired plus wireless" service, to compete with China Mobile's purely wireless service.

A spokesman from Guangdong Telecom indicated to Nanfang Zhoumo that the company is building its WLAN network in order to compete with wireless networks. They are installing transmitters throughout Guangzhou and Shenzhen, especially in hotels and conference venues. The spokesman also casts some doubts on the future success of WLAN as he thought it was a "luxury product" only suitable for business people. Users are expected to pay RMB 150 (USD 18) a month for unlimited access or RMB 100 (USD 12) for up to 60 hours use a month. The other option is to buy network cards in

hotels or other places where access is available for RMB 25 (USD 3) an hour.

In Guangdong WLAN users would pay Guangdong Telecom, in theory, though agents (card vendors especially) would play a major role as middle-men.

But as the MII has not awarded the frequency license to Guangdong Telecom, it could just as easily go to China Mobile, Guangdong Telecom is only making a relatively good makeshift use of wireless broadband, according to the paper. But the most apparent feature of China Telecom's activities in wireless broadband is that it reveals their real interest in securing a mobile operating license. The MII is likely to award another two mobile operator licenses at some point - the most obvious candidates being China Telecom and China Netcom - who both have "Mobile Service Divisions," which is unusual, as they are fixed line telecom operators.

At present there are a wide range of means to achieve wireless access to the Internet. WLANs generally rely on Bluetooth technology, and Wireless WAN relies on GPRS, CDMA, etc, as well as new developments in China including the IEEE8021 standard, a competing technology to Bluetooth, which is being developed as a WLAN application.

Networking equipment

There were no concrete WLAN production figures yet obtainable by Interfax, WLANs with high data-rate and backward-compatible extension have yet to realize any sort of volume production. In fact, a number of critical issues must be addressed before achieving ratification and regulatory approval. In general networking equipment itself is still a relatively unripe industry in China, with output quite low, there is obvious growth potential there. Last year (2001) saw 15 % growth. Manufacturing of network equipment is mainly carried out under OEM or CEM conditions, by Cisco, 3Com, Flextronics, et al, - but up-and-coming Chinese firms such as Huawei, ZTE and Legend are also making inroads into selling their high-end routers and Ethernet switches.

China's production output and exports of networking equipment 2001 (mln units)

Source: EETAsia

China's MII accords the mainstream market to 100 Mbs Fast Ethernet switches, followed by Gigabit and 10 Mbs switches. Cisco still maintains a 24% share of China's LAN market, and 70% of the router market according to EETAsia.

Besides Cisco's dominance, low-end routers are already the domain of local manufacturers - Huawei, Shenzhen SED Teletech, Procomp Infomatics, Core (Chengdu), and Sichuan Maipu Data Communications.

Currently China is capable of producing low-to-mid end networking equipment. Ethernet switches now have high-density ports, distributed switching structure, multiple Ethernet and optical communications interfaces that support Xenpak multiparty protocol and Internet routing protocols, as well as real-time voice and video. It is expected that core switches that support Layer 3 VLAN technology are expected to replace traditional routers in Wide Area Networks (WANs). Routers are expected to get new safety features -and get cheaper. Modems, such as V.90 protocol have become mainstream, while V.92 is anticipated to see growth.

Taiwan's network-equipment makers' recent aggressive pursuit of corporate orders for high-end business has proved unsuccessful for WLAN products and switches, among others, according to network-equipment makers. To boost their competitiveness, Taiwan makers, which are traditionally viewed as makers of low-end products, adopted the practice of cutting down prices, but have failed to deliver the performance required by the high-end market. Taiwan makers win orders from small players such as Linksys, Buffalo, and Netgear. However, Taiwan's price-competitiveness has not helped much when trying to obtain orders from Cisco, 3Com, and Nortel, for which products are performance-oriented and targeted at the high-end corporate level, and who have set about creating their own mainland China manufacturing facilities.

One former high-level executive from Nortel pointed out to Digitimes that Taiwan makers had aggressively sought its orders in the past, but were unsuccessful for Layer 3 and above products due to their weak software development. Only Accton Technology has managed to win manufacturing orders for Layer 2 switches.

Source: EETAsia

EVENTS

China ComputerWorld Expo & Conference 2002

September 18 -20 China World Hotel Beijing PRC China

CCW Expo & Conference, in its 9th year, a 3-Day, 6-Track Program featuring on Wireless LAN, Wireless Broadband Access, Wireless Security, Wireless Internet, Wireless Enterprise & Mobile Commerce that offering the landscape of wireless technologies for enterprise, for commerce, for provisioning broadband access and for telecom operators. Make plans now to attend this educational and exciting event. A This could be the most important three days of your year!

If you're serious to be a key player in China's growing wireless market, you cannot afford to miss this timely and informative conference to gain competitive advantage ahead of your competitors.

For online registration, visit or contact email: to register for an excellent networking opportunity with key decision makers in the world's largest wireless market - China!

For sponsorship information, please contact Ms. Iris Li at 852 2865 1118 or email to

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EVENTS

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For more details, visit the event web site at

Customer Contact World Shanghai

25 - 26 September 2002

Pudong Shangri-La, China

ANNOUNCEMENT

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China IT & Telecom Report

A weekly report covering the Internet, telecommunications and information technology in the PRC.

Interfax China Energy Report Weekly

A weekly report providing coverage of China's oil, gas, upstream petrochemical, coal and power sectors.

Interfax China Metals Report Weekly

A weekly report describing ferrous and non-ferrous metal industries of the PRC.

Central Europe IT and Telecom Report

A weekly report on Central European IT and Telecom markets.

Communications & Electronics Report

A weekly report on Russia & FSU computer industry, telecommunications, information technology and home electronics. The operations of foreign companies and new projects in the sector.

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Company Names: Shanghai Telecom

Industry Codes/Names: BUSN Business; INTL Business, international; HTEC High technology industry

Descriptors: China

13/9/8 (Item 8 from file: 16)

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LexisNexis and Knight Ridder Digital Form Interactive-Content Alliance; Knight Ridder Digital Extends Content to LexisNexis Users; LexisNexis Provides Information Solutions to All Knight Ridder Offices.

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DAYTON, Ohio and SAN JOSE, Calif. -- LexisNexis, a leading global provider of comprehensive, authoritative legal and business information solutions, and Knight Ridder **Digital**, interactive information subsidiary of Knight Ridder and founder/operator of the Real Cities Network, today announced the formation of an interactive-content alliance. Through the relationship, Knight Ridder **Digital** is syndicating its content available to LexisNexis users; and LexisNexis is powering access to on-point information to 17 Knight Ridder newspapers in 28 markets.

Twenty-eight full-text daily Knight Ridder publications from top media markets throughout the country now will be available to LexisNexis customers, many same-day or and within a day of publication, powered by Knight Ridder **Digital**. The offering includes major metropolitan papers such as The Miami Herald, The Philadelphia Inquirer and Daily News, the Detroit Free Press, The Charlotte Observer, the Pioneer Press in St. Paul-MN, and The San Jose Mercury News. The additional Knight Ridder content joins the thousands of world-class publications available to LexisNexis customers, enabling LexisNexis to be a leader in the news and business information marketplace.

"Our agreement with LexisNexis is another major step in creating new revenue streams from Knight Ridder **Digital** content," said Ken Doctor, vice president, content services for Knight Ridder

Digital. "LexisNexis is one of the premier information services in the world, and now for the first time Knight Ridder content will be available to its business, legal, academic and government desktop users. Those users will be further introduced to our most important newspaper brands and be able to **link** directly to them. We believe that in addition to customers finding our **content** through our destination sites, our **content** must actively find customers through **other** established channels of sales and distribution. The LexisNexis channel is a key, and we expect the partnership to grow over time."

In a separate agreement, Knight Ridder newspapers and LexisNexis announced a new, centrally-administered information services contract to enable Knight Ridder professionals access to the LexisNexis suite of information solutions. That contract brings wide exposure to LexisNexis(TM) research databases to the desktops of thousands of professionals at Knight Ridder, including nexis.com(SM) for journalists and editors conducting research, lexis.com(R) for Knight Ridder's legal staff, customized solutions for professionals in Knight Ridder's corporate offices, LexisNexis(TM) Political Universe for the Knight Ridder's Washington Bureau, and access to select Online Public Records and LexisNexis(TM) Company Dossier products across the country.

"We are excited to offer LexisNexis customers the high-quality news that Knight Ridder, the second largest newspaper publisher in the nation, produces, while driving our first-rate information solutions to Knight Ridder newsrooms and offices," said Dawn Conway, vice president of **content** licensing for LexisNexis. "This represents **another** move in our company's drive to magnify the breadth and depth of our information and provide our customers with the very best resources."

"Knowledge gained in research is a prime tool in creating great journalism," said Jerry Ceppos, vice president of news at Knight Ridder. "Desktop access to deeper and wider research and to public records databases will improve our reporting edge."

Knight Ridder Publications To Be On LexisNexis
The Philadelphia Inquirer (Philly.com)
Detroit Free Press (Freep.com)
The Miami Herald (Miami.com)
The San Jose Mercury News (BayArea.com)
The Charlotte Observer (Charlotte.com)
Saint Paul Pioneer Press (Twincities.com)
Contra Costa Times (BayArea.com)
Philadelphia Daily News (Philly.com)
Akron Beacon Journal (Ohio.com)
The State (ColumbiaToday.com)
Kansas City Star* (KansasCity.com)
Star-Telegram* (DFW.com)
The Lexington Herald-Leader (Kentucky.com)
Fort Wayne News Sentinel (FortWayne.com)
Columbus Ledger-Enquirer (RealColumbus.com)
Duluth News-Tribune (DuluthSuperior.com)
Centre Daily Times (RealStateCollege.com)
The Tallahassee Democrat (Tallahassee.com)
The Wichita Eagle (Kansas.com)
The Sun Herald (MississippiCoast.com)
The Bradenton Herald (Bradenton.com)
Belleville News-Democrat (Belleville.com)
The Macon Telegraph (Macon.com)
Grand Forks Herald (GrandForks.com)
El Nuevo Herald (Miami.com)
The San Luis Obispo Tribune (SanLuisObispo.com)
The Sun News (MyrtleBeachOnline.com)
Wilkes Barre Times Leader (WilkesBarreScranton.com)

* already on LexisNexis

About Knight Ridder, Inc. and Knight Ridder **Digital**

Knight Ridder is the nation's second-largest newspaper publisher, with products in print and online. The company publishes 32 daily newspapers in 28 U.S. markets, with a readership of 8.5 million daily and 12.6 million Sunday. Knight Ridder also has investments in a variety of Internet and technology companies and two newsprint companies. The company's Internet operation, Knight Ridder **Digital**, creates and maintains a variety of innovative online services, including Real Cities, the premier national network of city and regional destination sites in 58 U.S. markets. Knight Ridder and Knight Ridder **Digital** are located in San Jose, Calif. For more company information, visit <http://www.knightridder.com/> or <http://www.knightridderdigital.com/> .

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Samsung Electronics is partnering with Macy's for in- store promotion supporting manufacturer's Yepp **digital** audio players. Companies said Yepp line would be sold in new "Tech Shop" in Macy's Herald Square flagship store's Cellar section starting this week, marking introduction of **digital** convergence products to store. In fact, addition of Yepp line marks return of CE products to Macy's, which had CE section in its stores before exiting business in late 1990s to concentrate on more profitable items. Samsung **digital** audio kiosk is being installed in Tech Shop, companies said. As part of promotion, companies will be giving away merchandise, offering product demonstrations, conducting contest offering chance to win 20" Samsung TV/DVD combo. Companies also will host in-store performance by R&B group City High Nov. 12. Yepp players and City High events are being promoted on Macy's Jumbotron outside store, and on radio. Meanwhile, Samsung announced YP-30S Yepp joined its widening line of **digital** audio players. New wearable device at \$169.99 features download speed of 7 Mbps, which Samsung said made it "fastest unit on the market." Device comes bundled with Rio Port **Digital** Music software and 64 MB of embedded memory, which Samsung said allowed it to download up to 64 min. of high-quality (128 kbps) music in less than 10 sec. Unit can be worn around arm or neck via included straps or attached to clothing with included belt clip. YP-30S also is smallest **digital** audio player from company to date, measuring 1.7" (W) x 2.5" (H) x .67" (D). Retailers carrying device include Best Buy, CompUSA, Musicland. -----

Gemini Industries signed agreement to license Scottsdale Technologies' **Digital**-IR technology that allows remote control to be upgraded with product codes downloaded from Internet. Gemini will ship Philips brand 6-function remote with technology in Feb. at \$69 and is likely to expand it to 4- and 8-function devices as well, Business Development Vp Robert Heiblim said. Remote is updated by pointing it at PC screen displaying promotere.com Web site. Codes then are uploaded from screen via IR light signals and stored in remote. Rather than ROM chip typical in standard remote with preloaded product codes, **Digital**-IR-based remote has EPROM to accommodate those downloaded from Web site. In focus group tests, first-time users were able to complete process in 10 min., Heiblim said. Gemini will maintain Web site and update database and has **rights under** agreement to **license** technology to 3rd parties, he said. Philips will manufacture remote in Spain and market it in Europe, while Gemini handles sales in U.S. Scottsdale, founded in 1996, originally was purveyor of Light **Link** IR technology that it included in Program Master **remote** device that controlled TV, VCR and cable box and could be updated via software. It also marketed Electronic TV Host service that promised to deliver weekly TV listings to PC via modem. -----

Wal-Mart exclusively licensed Polaroid brand for 35 mm photographic film. Wal-Mart signed pact with Agfa, which controls some **rights** to Polaroid name. While Wal-Mart previously sold Polaroid film, it now has exclusive right to sell brand. Polaroid filed for bankruptcy protection in Oct. -----

Macrovision acquired patents and other intellectual property of AudioSoft International and MediaDNA. It described AudioSoft as developer of **digital** copyright licensing, tracking and management technologies for the music industry. It said MediaDNA produces **digital rights** management tools. Macrovision said AudioSoft Tracking Master product captured, organized and delivered worldwide information on usage of music on Internet. As part of transaction, Macrovision also acquired U.S. patent No. 6,202,056, which describes method for operating computer network to allow for accounting of usage **rights** for audio, video and other works in **digital** formats and for determining usage fees such as copyright royalties. Macrovision said MediaDNA's "cell" patents and technology, previously marketed as eMediator, bind usage rules and **rights** to individual pieces of **digital** content. **Digital** content remains protected no matter how many times it is distributed and used. MediaDNA's U.S. patent No. 5,845,281 describes method for securely managing and controlling use of data object, such as audio or video content or a software application. Macrovision said it intended to license AudioSoft technology to on-line music services so they could offer publishers and artists information on popularity of their music and accounting of royalties. Company said it also would license MediaDNA patents, which date from 1997 and cover fundamental areas used by **other DRM** companies and **content** delivery services. -----

Bestway Rentals received waiver from lender after violating requirement of \$10 million credit agreement governing interest coverage ratio, it said in SEC filing. Rental chain, which operates 83 stores, received series waivers earlier this year before credit agreement was formally amended Oct. 26 and extended to Feb. 28. Bestway sold stores in Lafayette, Tenn., and Hickory, N.C., this fall to Value Rentals and Rent-a-Center for \$216,841 and \$113,541, respectively. At same time, it purchased outlets in Tenn. from Instant Rentals (\$148,000) and Ala. from Zajac's Electronics Service Center (\$296,000). Bestway said net income for year ended July 31 fell to \$97,488 from \$397,413 year earlier as revenue rose to \$35.9 million from \$34.9 million. CE accounted for 32% of revenue, followed by home furniture (27%), appliances (16%). -----

CompUSA began promoting new online "game fixx" Web site last week and Sam Goody started promoting its venture into videogame business. One of Goody's first steps has been e-mailing customers of its online music/video business to inform them of retail chain's full selection of product across all platforms. Videogame segment isn't new for Best Buy, which acquired Goody stores when it bought Musicland earlier this year. -----

MicrosoftSF technology showcase/retail store in San Francisco's Metreon center closed last week. Landlord is Sony and closing comes 2 weeks before rollout of Microsoft's Xbox videogame system. One of Microsoft's main competitors on game console front, of course, is Sony Computer Entertainment's PlayStation 2. But closing of store coming so close to rollout of game system is just coincidence, Microsoft said. MicrosoftSF store opened in Metreon entertainment and shopping complex with much fanfare June 16, 1999. Microsoft spokeswoman told us last week: "We were open to a retail partnership with Sony in a new space they were developing in (San Francisco). We viewed this as an opportunity to explore this unique setup for us to sell directly to consumers. While we've been happy with the response to the store, we've decided we'd rather focus on our core business of developing... software and selling it via our current sales and distributions channels. The decision to close the store was mutual and our relationship with Sony remains very strong. In fact, we continue to collaborate with Sony on other projects, most notably, the recently announced PC for Life program." -----

MusicMatch reported record unit sales of its Jukebox personalized music software for Oct. San Diego company said software sales in month had "grown more than 60% since the same month last year." Company said its

"installed base and the number of MusicMatch Jukebox active users has more than tripled," saying "more than 24 million music fans are registered users of MusicMatch Jukebox... compared to 8 million just one year ago." Spokeswoman told us: "We don't share income/loss figures publically, but revenue growth was 63% over last year." Privately held company was started in 1997 with Thomson Multimedia, Redpoint Ventures and Intel Capital as principal investors. -----

SanDisk obtained permanent injunction against Viking Components, Rancho Santa Margarita, Cal., preventing latter from selling CompactFlash cards in U.S. it manufactures that incorporate Lexar Media's 1140, 1145, 1175 and 1250 controllers. Viking also paid SanDisk "nominal" undisclosed amount to settle patent infringement complaint that SanDisk filed in U.S. Dist. Court, San Francisco, earlier this year. Commenting on settlement, Viking co-CEO Glenn McCusker said: "While this has been a nuisance and a distraction, it has had no effect on our ability to support our customers' business." -----

Sears opened 2nd store that melds CE and appliances in freestanding location in Bolingbrook, Ill., and will add 3rd in Mount Prospect, Ill., by early Nov., Home Electronics Vp- Gen. Mgr. Ray Brown said. Sears opened first test store in Ind. earlier this year and thus far has posted sales incremental to existing department store locations, Brown said. "If you look at the trading area and the stores that used to service it incrementally we are growing that business," he said. Brown declined to release sales figures. While first 3 stores have same format, "I can't say we won't looking at tweaking it next year and 2002, to a certain degree, will vary (in format) at least slightly." -----

Lycos global Web network said Xbox was 29th most popular online search by its users in week ended Oct. 27. Xbox beat out PlayStation 2 (#39) for first time and was considerably ahead of GameCube, which Lycos said missed top 50. -----

Lawsuit over copy-protected CD has been filed against BMG Entertainment in Germany, source there told us. Details were scant at our deadline, but suit concerns CD compilation Just the Best 04/2001 that's said to be copy protected but not labeled as such. Suit is said to charge BMG with fraud, computer fraud and copyright misuse. Computer fraud claim is based on violation of CD Red Book standard under German law, which prohibits damage to "the property of someone by affecting the result of a data processing proceeding, by incorrect design of a program or use of false and incomplete data." -----

Hewlett-Packard started shipping HP **Digital** Entertainment Center at \$999. Internet-ready **digital** music component allows user to buy music online, download songs, create custom CDs from user's living room. Component can be connected to Web using either broadband or dial-up access with customer's existing Internet service provider (ISP). Via Web services offered by component, user can sample and acquire new music and tune into Internet radio stations worldwide searching by call letters, city, country, language, station name. User also can search for video content online such as movie trailers. Access also is provided to database of songs, video clips and **other** information, with **content** provided by Muze. Additional services and functions will be made available via downloads from Web, company said, noting it already had signed **digital** entertainment service agreement with RealNetworks. Company said it "also plans to continue developing relationships with **digital** entertainment service providers to broaden the capabilities" of component. Retailers carrying Entertainment Center include Best Buy stores nationwide and select Circuit City locations. -----

Concerns about PVR copying among entertainment content owners is being address by Macrovision. Copy protection powerhouse is developing "flexible yet secure" **digital rights** management system for PVRs, PCs and set-tops boxes, Pres.-CEO William Krepick told us last week. System is scheduled to arrive next year, he said. -----

R.C. Willey opened 130,000-sq.-ft. store in Henderson, Nev., marking entry into Las Vegas market. Salt Lake City- based chain, which plans up to 3 stores in Las Vegas area, is likely to open 2nd outlet in Summerlin, Nev., in 2003, Vp Steve Child said. -----

Compaq expanded its portable audio player line with iPAQ Personal Mini-CD Player at \$99.99. It said device offered 480-sec. shock protection and supported mini-CD-Rs and mini- CD-RWs. It comes with 555 MB of built-in storage. Company also started shipping previously announced iPAQ Personal CD Player PCD-1 at \$169.99. -----

Supreme Court last week rejected Indianapolis appeal of lower court ruling on city's law against violent videogames adopted in July 2000. Seventh U.S. Appeals Court, Chicago, ruled on case -- Kendrick v. American Amusement Machine Assn. -- in March 2001, saying Indianapolis law requiring parent's consent for child to play violent videogames in arcades or other commercial locations violated First Amendment. Judge Richard Posner in decision held that studies so far hadn't provided "evidence that violent videogames are any more harmful to the consumer or to the public safety than violent movies or other violent, but passive, entertainments." He said "violent videogames played in public spaces are a tiny fraction of the media violence to which modern American children are exposed" -- and violence in movies and on TV seemed to be even more graphic, especially in light of games' "cartoon characters" that "no one would mistake" for images of real people. Indianapolis later appealed to Supreme Court, asking it to decide on govt.'s power to limit children's access to violent videogames. Supreme Court turned down appeal with no comment. Under original law, Indianapolis could have fined arcade owners \$200 per day for each violation. -----

Amazon.com revealed in SEC filing that as of Sept. 30, "1,320 employees had been terminated and actual termination benefits paid were \$11 million." E-tailer said job cuts were made as part of restructuring to reduce operating costs, streamline structure and consolidate certain fulfillment and customer service operations. Cuts made were throughout company in clerical, fulfillment, professional and technical departments. Company said it also saved money via "migration of a large portion of its technology infrastructure to a Linux-based operating platform." Technology costs were significantly reduced in 3rd quarter as result of that migration, Amazon said: "We expect to continue to invest in technology and improvements in our Web sites during the remainder of 2001 and 2002, which may include, but is not limited to, offering additional product categories to our customers and implementing additional strategic alliances, as well as potentially continuing our international expansion." Company also described impact terrorist attacks had on its business in filing: "Immediately following the events of September 11, 2001, customer purchases significantly declined but have recovered. We estimate that the net sales impact as a result of the events... was between \$25 million and \$35 million." Meanwhile, company, as expected, opened Magazine Subscriptions store at its Web site. Separately, lawsuit company filed to prevent former international CFO Christopher Zyda from taking job at eBay was thrown out of U.S. Dist. Court, Seattle, because Judge Barbara Rothstein ruled federal courts had no jurisdiction in matter. Amazon expressed disappointment with ruling, saying Zyda's noncompetition and confidentiality agreements with Amazon should prevent him from taking job at competitor eBay. Spokeswoman told us Amazon will likely pursue case but declined to say what court it would be in, adding "the merits of the case have yet to be argued." -----

Target store opened at Amazon.com's Web site last week featuring link to Target.com. Electronics section includes audio, cameras, media storage, phones and TV/video categories. Items being offered at Amazon's Target store not being sold at Amazon's own electronics store included Canon Elph LT APS camera and Philips progressive scan DVD player. But overall number of CE items available at Amazon's Target store was significantly less than Amazon.com electronics store offers. Separately, Amazon Credit Account, virtual "cardless credit card" was unveiled. Online

equivalent of department store credit card allows e-tailer's customers to buy product now and pay later. As introductory promotional offer, Amazon said customers who sign up for Credit Account now will get 3 months of no payments and interest-free holiday shopping on orders over \$200 placed through Jan. 31. Service is being provided by Amazon.com Financial Services and Citibank Cards division Citi Commerce Solutions. -----

Advertised \$999.99 price for new Panasonic DVD-RAM deck is decision by retailers and doesn't reflect change by vendor, Panasonic executive told us. DMR-E20 recorder made debut at Best Buy and elsewhere Oct. 20 at \$999.99 -- \$500 lower than Panasonic's MSRP. "The original MSRP was \$1499 and it still is," said Rudy Vitti, mgr., **digital** recorder category: "Retailers decide the price. Obviously they have to make some money on them, and there's the possibility they can sell for \$999. But there's been no suggested price drop from Panasonic." -----

Tremor Entertainment shareholders approved merger plan making Burbank Xbox videogame developer subsidiary of New Systems. If deal is finalized, Tremor will become public company and New Systems will change its name to Tremor Entertainment. Tremor is under contract with Microsoft to create original action fantasy game under Microsoft label for Xbox. Title is scheduled to ship next fall. Tremor CEO Steven Oshinsky said: "With the approval of the Tremor shareholders now in place, we have entered the final regulatory process to complete the merger which we expect will occur in the next 30 days. Tremor is now tracking its 2nd year of more than 100% growth in revenue with 2002 estimated at (\$2.9 million), up from (\$1.3 million) in 2001, and \$502,205 in 2000. Becoming a public company is now essential to our growth, as game development become more capital intensive in terms of time and personnel required." -----

Ubi Soft Entertainment expressed confidence last week about 2nd half of its fiscal year, saying that despite "uncertain economic climate... the videogame industry remains dynamic due to the fast growth of the new machine installed base." Paris-based game maker said it planned to ship "over 100 new games between now and March 22, 61 of them in the 3rd quarter" (Oct.-Dec.) across all platforms and genres. Company said: "By the end of the current fiscal year, the group will have added another 160 titles to its catalog, 30 of them PlayStation 2 (PS2), 5 for GameCube (with 2 titles at the console's launch in the U.S.A., Disney's Tarzan Untamed and Batman: Vengeance), 3 for Xbox and 30 for Game Boy Advance" (GBA). Company made comments as it announced 2nd quarter consolidated sales increased 24% to 53.1 million euros (\$47.8 million) from 42.9 million euros (\$38.6 million) in same quarter year ago, while first-half sales improved 72% to 113.4 million euros (\$102.2 million) from 65.9 million euros (\$59.4 million). Game maker said it published 46 new titles in first half of its year -- 6 more than same period year ago. Ubi Soft added: "The good performance in the first half of the year, which normally does not exceed 30% of Ubi Soft's business for the year, combined with the quality of the future portfolio of games, allows the group to confirm its targets for the 2001/2002 fiscal year: 35-40% increase in sales (and) net margin of between 4 and 5%." -----

Rent-a-Center (RAC) agreed to pay \$12.2 million to 4,600 female employees as part of proposed settlement of sex discrimination suit filed year ago. Margaret Bunch had filed suit in Dec. 2000 in U.S. Dist. Court, Kansas City, alleging sex discrimination began shortly after Renter's Choice purchased RAC from Thorn Americas in 1998. RC later changed name to RAC. Settlement covers female workers employed between April 19, 1998, and Oct. 1. Second suit on similar grounds, filed by Claudine Wilfold in Aug. 2000, still is pending in U.S. Dist. Court, St. Louis. Wilfold and 18 other plaintiffs are seeking \$410 million in damages. RAC Pres. Mitchell Fadel said proposed settlement was in "best interests" of company "given the costs and uncertainty of litigation." Gene Graham, attorney for Bunch and others, termed agreement "a fair and favorable resolution of claims that have been vigorously contested." In addition to monetary settlement, RAC must: (1) Adopt policy against gender discrimination and provide

employee training on subject. (2) Eliminate weight lifting requirements. (3) Modify internal procedures for reporting gender discrimination. (4) Add "more comprehensive" record-keeping for employment applications and promotions. -----

Microsoft selected Activision as distribution partner for Xbox videogame system in Germany. Santa Monica, Cal., game maker Activision will distribute Xbox hardware and software to German independent retail channels -- excluding toy channel -- via its established NBG EDV Handles & Verlags subsidiary. Activision said deal "further strengthens" its distribution and marketing operations in Germany where it provides games from Activision and other leading independent software publishers. Xbox Gen. Mgr. J Allard said company had "invested considerable time and resources into potential distribution partnerships" and believed Activision deal would "result in greater overall efficiencies for Microsoft." Latter said NBG was named Xbox partner "after a thorough selection process led by" Microsoft Home & Retail Div. Dir. Risto Rautakorpi and "was chosen based on meeting a number of criteria including skills, experience, efficiencies in customer management, leading edge approach, account management, logistical execution, system's flexibility, adequacy of storage facilities and financial strength." Xbox is scheduled to ship in Europe March 14 at 479 euros (\$434), following Nov. 15 N. America rollout at \$299. -----

New joint venture Xsido was formed by Sega, Japanese Web investor Softbank and Taiwan PC manufacturer Acer to distribute games via high-speed Internet networks, Tokyo report said last week. New company will offer Sega Dreamcast games and **other** entertainment **content** by companies including Namco and Avex to Internet service providers (ISPs), along with device that makes software available to users regardless of specifications of their PC or videogame console. ISPs then will sell games and entertainment content to consumers. Business has been capitalized at 534 million yen (\$4.4 million) and is targeting ISPs in Japan, S. Korea, Taiwan. Investors SK Global and Winstron each holds 14.6% stake in company. Latter is Acer subsidiary that will be making software device. Sega also has 14.6% stake in company, while Softbank invested 30%. -----

Nam Tai Electronics, blaming worldwide economic slowdown, said 3rd quarter net income slid 12% to \$3.7 million from \$4.2 million year earlier, despite 4% rise in sales to \$59.6 million from \$57.2 million. Nam Tai, which took \$5.5 million charge in 2nd quarter for write-off of assets and provisions for slow-moving raw materials, ended quarter with \$40.1 million cash. It also has invested \$15 million in designing and building new STN LCD production line in China that will mainly produce panels for mobile phones marketed under own and Vtech brands, company said. -----

Olympus D-40 Zoom and E-20 N were among new **digital** still cameras (DSCs) spotlighted at PhotoPlus Expo at Javits Center in N.Y.C. last week. More than 200 exhibitors attended show to spotlight new imaging technology and photo products for professional and advanced amateur photographers. Olympus DSCs were already announced last month but were being shown to public for first time at show, spokesman told us, noting 5-megapixel E-20N at \$1,999 replaces E-10 as company's flagship DSC. Latter model shipped in Aug. 2000 at same price as new model before being reduced to \$1,599, he said. New DSCs were also shown by Canon, Kodak, Nikon. Canon introduced high-end 4-megapixel **digital** SLR EOS-10, while Kodak showed DCS 720x **digital** SLR with shutter response speed said to "rival that of conventional film cameras." Nikon spotlighted new D1 **digital** SLRs D1X and D1H and announced start of NikonPro online service for professional photographers. Despite Olympus emphasis on cameras, among most prominently-displayed item at company's booth was once again line of 4 Eye-Trek multimedia display units ranging in price from \$599-\$1,199. Line includes FMD-20P at \$599, which was designed exclusively to be used in conjunction with Sony's PlayStation 2 game console. It was also demonstrated at Electronic Entertainment Expo (E3) in May. Company has yet to find wide consumer audience to buy Eye-Trek

devices, Olympus spokesman told us, noting company has yet to market them on mainstream level. -----

Concord Camera ended 7-year legal battle with former CEO Jack Benun, having received \$1.13 million arbitration award plus \$45,175 interest. Concord had sought \$1.5 million in filing arbitration claim in 1994 that alleged Benun had embezzled corporate funds. Benun was paid \$202,740 for loan to Concord plus interest. In Aug., N.J. Superior Court judge granted Concord's motion for summary judgment and dismissed suit in which Benun sought \$4 million for stock options and guarantee fees. He had filed suit in April that also sought to reduce \$1.1 million arbitration award. Meanwhile, Concord, hampered by bankruptcy of major customer Polaroid, reported first quarter loss of \$868,175, reversing year-earlier profit of \$6.2 million, as sales plunged to \$35.2 million from \$62.7 million. In connection with Polaroid's bankruptcy filing, Concord recorded \$1.6 million and \$1.7 million provisions for accounts receivable and inventory, respectively. Polaroid had sourced single-use and **digital** cameras from Concord. Concord also incurred \$302,000 in payments in earlier restructuring plan in which it closed single-use camera labeling factory in China and cut 2,000 jobs from overall manufacturing operations there. It also trimmed 71 jobs outside China. Concord had taken \$1.4 million charge against 4th quarter earnings to cover most of restructuring. -----

XM Satellite Radio had more than 500 subscriber activations as of Sept. 30, 5 days after commercial service was introduced in Dallas-Ft. Worth and San Diego, company said in reporting 3rd quarter financial results. It said it since had seen "ramp-up" of subscriber activations as new markets were added and additional retail outlets began carrying XM receivers, but it didn't specify figure. Terrorist attacks delayed Sept. 12 rollout activities in Dallas and San Diego and "slowed the delivery of XM radios into the distribution chain," but problems there have been resolved, company said. Completion of national rollout is on schedule for mid-Nov., when XM receivers will be available in 6,000 storefronts, company said. XM consolidated losses narrowed to \$70.8 million (-\$1.14 per share) in quarter vs. year-earlier \$160.1-million loss (-\$3.26).

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Event Names: *380 (Strategic alliances)

Geographic Names: *1USA (United States); 9SOUT (South Korea)

Product Names: *5311000 (Department Stores); 3600000 (Electrical & Electronic Equip)

Industry Names: BUSN (Any type of business); ELEC (Electronics)

SIC Codes: 5311 (Department stores); 3600 (ELECTRONIC & OTHER ELECTRIC EQUIPMENT)

NAICS Codes: 45211 (Department Stores); 335 (Electrical Equipment, Appliance, and Component Manufacturing)

Ticker Symbols: WMT; PRD

Special Features: LOB; INDUSTRY; COMPANY

13/9/10 (Item 10 from file: 16)

09060798 ? ?Supplier Number: 79018687

SONICblue Introduces New Diamond Supra V.92 56K Analog Modems; New Diamond SupraMax PCI & SupraSST PCI V.92 Modems Offer Industry Leading Value Proposition.

Business Wire , p 2073

Oct 10 , 2001

Language: English ? ?Record Type: Fulltext

Document Type: Newswire ; Trade

Word Count: 664

Text:

Business Editors/High-Tech Writers

SANTA CLARA, Calif.--(BUSINESS WIRE)--Oct. 10, 2001

SONICblue(TM) Incorporated (Nasdaq:SBLU), unleashed superior dial-up modem performance today with the launch of its new Diamond SupraMax(TM) V.92 PCI and Diamond SupraSST V.92 PCI modems. Incorporating the new ITU V.92 and V.44 technologies, SONICblue, an industry leader, is the first manufacturer to completely transition its entire Diamond Supra modem product line to the new industry standards and provide a vastly improved Internet dial-up modem experience for consumers.

"The Diamond Supra V.92 modems offer an industry leading value proposition, providing compelling new features and performance at the same price," said Duane Dickhut, vice president, Access product line, SONICblue. "We believe the new V.92 modems are an excellent upgrade to existing PC's, enabling consumers to greatly improve the performance, reliability, and quality of their Internet connections."

New V.92 Features

In addition to faster Internet speeds through use of V.92-based dial-up connections, the new SupraMax and SupraSST V.92 modems add four important new features: Quick Connect, Modem-on-hold, PCM Upstream and V.44 data compression.

-- Quick Connect reduces the amount of time it takes for the modem and **server** to **link**, cutting connect time by up to 66% and putting users online almost instantly.

-- Modem-on-hold enables a standby mode that allows users to take an incoming voice call, or even place a call, without losing their Internet connection.

-- PCM Upstream increases maximum upload speeds to 48Kbps and allows users to more quickly transfer large e-mail messages, documents, spreadsheets, presentations or photos.

-- V.44 Compression delivers compression technology that increases the throughput of HTML, text and **other** common Internet **data** types by 30 to 40%. The

SupraMax modems are supported by all major operating environments including Windows 95, 98, 98SE, Me, 2000, XP and NT 4.0.
Pricing and Availability
The Diamond SupraMax V.92 PCI modem will be available shortly in

North American retail outlets including Best Buy, Circuit City, and Fry's Electronics at \$39.95 MSRP. The Diamond SupraMax V.92 PCI and Diamond

SupraSST V.92 PCI modems will also be available shortly in North American distribution channels and system integrators. In addition, the Diamond SupraMax V.92 USB modem is currently available in North American retail outlets at \$49.95 MSRP. For more information on Diamond Supra V.92 modems, visit SONICblue's home page (www.SONICblue.com).

About SONICblue Incorporated (www.SONICblue.com)

SONICblue is a leader in the converging Internet, **digital** media, entertainment and consumer electronics markets. Working with partners that include some of the biggest brands in consumer electronics, SONICblue creates and markets products that let consumers enjoy all the benefits of a **digital** home and connected lifestyle. SONICblue holds significant financial assets, global marketing capabilities and a focused technology portfolio that includes Rio(R) **digital** audio players; ProGear(TM) Information Appliances; ReplayTV(R) personal television technology and software solutions; Go-Video(R) Dual-Deck(TM) VCRs and integrated DVD+VCRs and California Audio Labs high-end home entertainment theater components.

Except for the historical information contained herein, the matters set forth in this press release, including statements as to the expected date of availability of the SupraMax PCI and SupraSST PCI modems, are forward-looking statements within the meaning of the "safe harbor" provisions of the Private Securities Litigation Reform Act of 1995. These forward-looking statements are subject to risk and uncertainties that may cause actual results to differ materially, including, but not limited to, the ability of the Company, its suppliers, retailers and distributors to meet the scheduled product release date, the impact of competitive products and pricing and of alternative technological advances, uncertainties arising from the events that occurred in the United States on September 11, 2001 and other risks detailed from time to time in the SEC reports of SONICblue Incorporated, including its quarterly report on Form 10-Q for the quarter ended June 30, 2001. These forward-looking statements speak only as of the date hereof. SONICblue disclaims any intention or obligation to update or revise any forward-looking statements.

SONICblue, Diamond, HomeFree and SupraMax are trademarks of SONICblue Incorporated. Rio is a registered trademark of RioPort.com, Inc. and is used by SONICblue **under license** from RioPort.com, Inc. Other marks referenced herein are the property of their respective owners.

To take full advantage of the new V.92 standard, users must be connected to an Internet Service Provider (ISP) with V.92 modem technology.

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Publisher Name: Business Wire

Company Names: *SONICblue Inc.

Industry Names: BUS (Business, General); BUSN (Any type of business)

Special Features: COMPANY

13/9/11 (Item 11 from file: 16)

08997921 ? ?Supplier Number: 78387642

SONICblue Licenses ReplayTV Software and Hardware to Support Rollout of Dotcast Digital Network.

Business Wire , p 2117
Sept 19 , 2001
Language: English ? ?Record Type: Fulltext
Document Type: Newswire ; Trade
Word Count: 1025

Text:

Business Editors/High-Tech Writers

SANTA CLARA, Calif.--(BUSINESS WIRE)--Sept. 19, 2001

ReplayTV Technology to be Integrated With Dotcast's New Content Distribution Network

In an agreement established to provide Dotcast-enabled consumer devices with **digital** video capture and playback functionality, SONICblue(TM) (Nasdaq:SBLU) today announced that it has agreed to license its ReplayTV(R) **digital** video recording technologies to Dotcast, Inc. The agreement allows for the use of ReplayTV DVR technologies in the Dotcast **Digital** Network(TM), a new wireless broadband network capable of distributing massive amounts of **digital content** nationwide.

SONICblue and Dotcast have agreed to integrate the ReplayTV software platform and hardware **reference** designs on a non-exclusive basis with a DotBox receiver -- a **digital** network device that will manage the storage of video, **music**, and **other** rich media delivered to consumers over the Dotcast **Digital** Network. Through agreements with approximately 200 broadcasters, Dotcast will be able to cost-effectively distribute DVD-quality feature-length movies, CD-quality music albums, video games, e-books, software applications, television programming and Internet content directly to the consumer.

"We firmly believe that this new method of content delivery is coming soon to the home, and that our technology and strong intellectual property position will be essential elements in these emerging consumer content delivery services," said Ken Potashner, CEO and chairman, SONICblue. "Our work with Dotcast, as well as other licensees, underscores our belief that SONICblue's licensing strategy will enhance the success of our own ReplayTV hardware offerings and accelerate mass consumer adoption of personal television."

"SONICblue's ReplayTV software and hardware reference designs are ideal complements to our technologies," said David E. Atkinson, founder, chairman and CEO of Dotcast Inc. "They enable Dotcast to extend its network to an expanding market of **digital** entertainment users. Working with SONICblue is one of the key elements of our strategy to Dotcast-enable a wide range of consumer and business devices that will revolutionize the delivery of **digital** content to homes and businesses."

SONICblue recently announced the first home-networked DVR, the ReplayTV 4000, which will begin shipping in November. ReplayTV software technologies can be found on Motorola **digital** cable set-top boxes, expected to initially roll out to cable operators in Q4. ReplayTV software technologies and service solutions can also be found on Panasonic's ShowStopper hard disk recorders, which are sold in consumer electronics retailers nationwide. ReplayTV technologies are available for license to manufacturers of set-top boxes, DVRs, home-media servers and networked-entertainment appliances.

About SONICblue Incorporated (www.SONICblue.com)

SONICblue is a leader in the converging Internet, **digital** media, entertainment and consumer electronics markets. Working with partners that include some of the biggest brands in consumer electronics, SONICblue creates and markets products that let consumers enjoy all the

benefits of a **digital** home and connected lifestyle. SONICblue holds significant financial assets, global marketing capabilities and a focused technology portfolio that includes Rio(R) **digital** audio players; ProGear(TM) Information Appliances; ReplayTV(R) personal television technology and software solutions; Go-Video(R) Dual-Deck(TM) VCRs and integrated DVD+VCRs and California Audio Labs high-end home entertainment theater components.

About Dotcast Inc.

Dotcast is a privately held company based in Mountain View, Calif. that provides high-speed delivery and management services that bring entertainment and business information directly to millions of people over a first-of-a-kind network. Dotcast's proprietary technology supports delivery of data and video services through the world's existing broadcast television infrastructures, including NTSC and DTV in North America, and PAL and DVB in other countries. The Dotcast **Digital** Network enables rich media service providers to manage the delivery of a range of content services in a timely, flexible and cost-effective manner. These rich media services can be delivered simultaneously to a nation of users or they can be selectively sent to markets of targeted customers. For more information on Dotcast, please visit <http://www.dotcast.com>.

Except for the historical information contained herein, the matters set forth in this press release, including statements as to the expected features, benefits and availability of the new DotBox **digital** receiver and Dotcast **Digital** Network integrated with ReplayTV DVR technologies, expectations regarding the **digital** entertainment content delivery market and SONICblue's position in that market, the expected benefits of SONICblue's licensing strategy, and the expected release date of the Motorola **digital** set-top boxes, are forward-looking statements within the meaning of the "safe harbor" provisions of the Private Securities Litigation Reform Act of 1995. These forward-looking statements that are subject to risk and uncertainties that may cause actual results to differ materially, including, but not limited to, the ability of the companies to develop the integrated receiver and integrate the ReplayTV DVR technologies with the Dotcast **Digital** Network, the ability of SONICblue and Motorola to develop the integrated **digital** cable set-top boxes and to meet the scheduled product release date, the impact of competitive products and pricing and of alternative technological advances and other risks detailed from time to time in the SEC reports of SONICblue Incorporated, including its quarterly report on Form 10-Q for the quarter ended June 30, 2001. These forward-looking statements speak only as of the date hereof. SONICblue, ReplayTV and Dotcast disclaim any intention or obligation to update or revise any forward-looking statements.

Note to Editors: SONICblue is a trademark of SONICblue Incorporated. ReplayTV is a registered trademark of SONICblue Inc Incorporated. Rio is a registered trademark of RioPort, Inc. and is used by SONICblue **under licenses** from RioPort Inc. Dotcast, Inc., DotBox, and the Dotcast **Digital** Network are trademarks or registered trademarks of Dotcast, Inc. in the United States and other countries. All other products and brand names as they appear in this release are trademarks or registered trademarks of their respective holders. All specifications may be changed without notice.

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Special Features: COMPANY

13/9/12 (Item 12 from file: 610)

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SONICblue Licenses ReplayTV Software and Hardware to Support Rollout of Dotcast Digital
Network-ReplayTV Technology to be Integrated With Dotcast's New Content Distribution Network

Business Wire

Wednesday , September 19, 2001 ? 08:47 EDT

Journal Code: BW ?Language: ENGLISH ?Record Type: FULLTEXT ?Document Type:
NEWSWIRE

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Text:

SANTA CLARA, Calif., Sep 19, 2001 (BUSINESS WIRE)
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<http://www.dotcast.com>.

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Company Names: sonicblue incorporated; GO VIDEO INC; CALIFORNIA AUDIO LABS; BOHLE AND CIE GMBH; BOHLE GMBH

Geographic Names: AMERICAS; CALIFORNIA; NORTH AMERICA; USA

Product Names: BROADCASTING; BUSINESS SERVICES; COMMUNICATIONS TECHNOLOGIES; COMPANY PROFILES; COMPUTER GAMES; COMPUTER SOFTWARE; COMPUTERS; CONSUMER ELECTRONICS; CORPORATE; CORPORATE FINANCIAL DATA; CORPORATE NETWORKS; DATA COMMUNICATIONS; LEISURE; MEDIA INDUSTRIES; MULTIMEDIA; NETWORKS; RETAILING AND DISTRIBUTION

Event Names: ADVERTISING AND PROMOTION; CORPORATE FINANCIAL DATA; SERVICES; STOCKS AND SHARES; TECHNOLOGY DEVELOPMENT

13/9/13 (Item 13 from file: 16)

08522866 ? ?Supplier Number: 73302254

The American Education Corporation Announces Letter of Intent With Tengtu International.

Business Wire , p 0091

April 17 , 2001

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Text:

Business/Technology Editors

OKLAHOMA CITY--(BUSINESS WIRE)--April 17, 2001

Company Will License Technology and Content for China's K-12 and Post-Secondary Educational Markets

The American Education Corporation (OTC/BB:AEDU) (AEC) today announced that the Company has signed a letter of intent with Tengtu International, Inc. (OTC/BB:TNTU) (Tengtu) of Toronto, Canada, entering into a strategic partnership to market, **sub-license** or deploy its recently released A+nyWhere Learning System(TM) management software, with integrated authoring and assessment tools, for the People's Republic of China (PRC).

Tengtu is a U.S. public corporation that develops and markets educational and entertainment multimedia software and related services through a joint venture and its subsidiaries in the People's Republic of China and Hong Kong. Tengtu is currently partnering with Microsoft China to deliver an interactive software package to approximately 14,000 schools targeted in the PRC's Operation Morning Sun by the Chinese government to bring the benefits of information technology (IT) to selected schools. Tengtu's role in China, through its several joint ventures with Chinese companies such as Legend **Digital** China, is to: (1) Fulfill the government mandate with its Chinese partners to bring the K-12 school system of the People's Republic of China into the twenty-first century with

information technology; and (2) Assist the government in achieving the mandate jointly with Tengtu's Chinese corporate partners to act as the gateway to China's educational and cultural electronic publishing sectors.

Tengtu Chairman & CEO Pak K. Cheung revealed that the new business model of the company reaches beyond its current K-12 base in China, where it markets the Tengtu Total Solution to a universe of 800,000 primary and secondary schools with 200 million pupils, to the huge post-secondary e-learning market in the world's largest nation. "Partnering with American Education will give Tengtu a powerful platform to penetrate the adult education and training market which dwarfs our original K-12 market, which is vast in itself. The A+nyWhere Learning System software engine perfected by American Education is just what we have been looking for in terms of authorability, flexibility and scalability to serve not only our present K-12 clients but also the enormous emerging market for post-secondary education as China tries to catch up with the West," Cheung stated. Additional information on Tengtu and its various China-based joint venture partnerships may be found at www.tengtu.com. These objectives are addressed within China by Tengtu's joint venture, Tengtu United Electronics, Ltd. in which Tengtu owns a 57% interest. The remaining 43% is jointly owned by Beijing Tengtu Culture and Education Development Company, Ltd., which includes the following major Chinese-owned IT corporations as partners: Legend Computer Group, Great Wall Computer Group, Taiji Computer Corporation and Beijing Oriental Lianfa Company, Ltd.

In making this announcement, Jeffrey E. Butler, AEC's Chief Executive Officer, stated: "This is a very exciting development for the Company. The long-range potential of this strategic partnership is significant to the continued development and emergence of American Education as a significant player in the future of e-learning on a worldwide basis. Tengtu approached the Company after learning of the capabilities of AEC's new and recently released Java 2-based learning management system (LMS) software. Tengtu had been searching for some time for technology that had the capabilities, flexibility, authorability and scalable attributes designed into the A+nyWhere Learning System(TM) software engine. Critical to their specifications was an authorable, scalable software-based platform, capable of handling student academic performance data integration with major database providers that would be capable of supporting long-term development and delivery of instructional content in the Chinese language with accompanying specialized assessment testing. Further, the platform had to be suitable for a range of **other** to-be-developed instructional **content**, not only for the K-12 market, but also for the broader adult content needs for training and the post-secondary markets. Simply put, this arrangement is possible because these features and more are designed into the A+nyWhere Learning System's powerful learning management system engine technology.

Butler continued, "With respect to the future impact of this development on AEC's future financial performance, it is too early to forecast or speculate on potential results. Many details have to be sorted out regarding the final nature of distribution of the financial results of the strategic partnership. Clearly the opportunity is large and, if everything goes according to plan, the future for new potential business is significant and should have a positive impact on the Company's future top line growth and earnings."

The Company's A+nyWhere Learning System and A+SSESS! Version 3.0, released in early 2001 provides for an updated software version to support the Company's extensive curriculum content and skills assessment tools in a fully managed solution that is designed to run over networks and the Internet. This family of educational software products provides an integrated suite of grade level 1-12 software for Reading, Mathematics, Language Arts, Science, Writing, History, Government, Economics and Geography publications. In addition, the Company has developed companion academic skill assessment products, A+SSESS!(TM), to provide educators with the means to more effectively target the use of the Company's curriculum

content and to manage for accountability. Spanish language versions are available for Mathematics and Language Arts for grade levels 1-9. The Company's curriculum **content** is electronically **linked** and aligned to the World Book Multimedia Encyclopedia, the leading **reference** encyclopedia for the school market allowing **reference content** from World Book's rich multimedia curriculum-based **reference** material to be accessed directly from A+LS lessons. The A+LS comprehensive family of educational software is now in use in over 9000 schools, centers of adult literacy and correctional institutions.

Note: Certain matters discussed above concerning the future performance of the Company are forward-looking statements intended to qualify for the safe harbors from liabilities established by the Private Securities Litigation Reform Act of 1995. These forward-looking statements can be identified as such by words such as "believes," "anticipates," "plans," "expects" or words of similar import. The future performance of the Company is subject to a number of factors including, but not limited to, general economic conditions, competitive activity and funding available to schools.

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13/9/14 (Item 14 from file: 610)

00500230 ? 20010417107B9951

SONICblue's Access Division Releases the Latest 56K Analog Modem-New SupraMax USB Modem with New V.92 and V.44 (ITU) Support Significantly Accelerates the Dial-Up Networking Experience

Business Wire

Tuesday , April 17, 2001 ? 08:01 EDT

Journal Code: BW ?Language: ENGLISH ?Record Type: FULLTEXT ?Document Type: NEWSWIRE

Word Count: 841

Text:

SANTA CLARA, Calif., Apr 17, 2001 (BUSINESS WIRE)
- Access, a division of SONICblue(TM) Incorporated (Nasdaq:SBLU), unleashed superior dial-up modem speeds today with the launch of its new Diamond SupraMax(TM) USB modem. Through support for the new ITU V.92 and V.44 technologies, the SupraMax USB combines the industry's highest Internet speeds with advanced features and functionality to provide the best dial-up modem solution available today.

"With the ever-increasing levels of data-rich content proliferating the Internet, dial-up web users are finding it harder and harder to stay

connected

within the constraints of today's 56K dial-up environment," said Duane Dickhut, Vice President and General Manager of SONICblue's Access Division. "We believe that dial up access, on a global basis, continues to be the way a significant majority of today's connected households go online. While we are focused on a wide variety of Internet access and home networking technologies, we continue to innovate dial-up connections and have designed our new SupraMax USB modem to deliver the latest analog modem technology."

In addition to faster Internet speeds through use of V.92-based dial-up connections(1), the new SupraMax USB modem adds four important new features:

Quick Connect, Modem-on-hold, PCM Upstream and V.44 data compression.

- Quick Connect reduces the amount of time it takes for the modem and **server** to **link**, cutting connect time by up to 66% and putting users online almost instantly.
- Modem-on-hold enables a standby mode that allows users to take an incoming voice call, or even place a call, without losing their Internet connection.
- PCM Upstream increases maximum upload speeds to 48Kbps and allows users to choose the fastest downstream speed for faster and smoother two-way transfer of large e-mail messages, documents, spreadsheets, presentations or photos.
- V.44 Compression delivers compression technology that increases the throughput of HTML, text and **other** common Internet **data** types by 30 to 40%.

The SupraMax USB dramatically simplifies modem installation, using a simple one step USB connection process that eliminates the PCI card installation procedure. The SupraMax USB is supported by all major operating environments including Windows 98, 98SE, Me, 2000 and upcoming releases.

Pricing and Availability

The Diamond SupraMax USB Modem will be available through national retailers on April 26, 2001 at suggested retail price of US\$69.99. Additional information about the SupraMax USB modem is available at www.supra.com.

About Access

Access, a division of SONICblue, is driving the home networking market by providing products and solutions for today's connected consumer. The rapid evolution of networking technology and ever expanding Internet content presents significant business opportunities to create a new level of consolidated and simplified complete home data access and control solutions.

Access has emerged as a world leader capable of developing technologically advanced and easy-to-install products for this important environment.

Access intends to continue to experience market success by leveraging its strong reputation for product quality and a commitment to customer support. The

Access division sells its product through a network of domestic distributors,
and directly to major retailers/ mass merchants and OEM customers.

About SONICblue Incorporated (www.SONICblue.com)

SONICblue is a leader in the converging Internet, **digital** media and consumer device markets. Working with partners that include some of the biggest brands in consumer electronics, SONICblue creates and markets products that let consumers enjoy all the benefits of a **digital** home and a connected lifestyle. SONICblue holds significant financial assets, global marketing capabilities and a focused technology portfolio, that includes Rio(R) **digital** audio players, HomeFree(TM) home networking solutions, Diamond(TM) Internet access products and frontpath(TM) Information Appliances.

Except for the historical information contained herein, the matters set forth in this press release, including statements as to the expected date of availability of the SupraMax USB modems, are forward-looking statements within the meaning of the "safe harbor" provisions of the Private Securities Litigation Reform Act of 1995. These forward-looking statements are subject to risk and uncertainties that may cause actual results to differ materially, including, but not limited to, the ability of the Company, its suppliers, retailers and distributors to meet the scheduled product release date, the impact of competitive products and pricing and of alternative technological advances and other risks detailed from time to time in the SEC reports of SONICblue Incorporated, including its annual report on Form 10-K for the year ended December 31, 2000. These forward-looking statements speak only as of the date hereof. SONICblue disclaims any intention or obligation to update or revise any forward-looking statements.

Note to Editors: SONICblue, Diamond Multimedia, frontpath, HomeFree and SupraMax are trademarks of SONICblue Incorporated. Rio is a registered trademark of RioPort.com, Inc. and is used by SONICblue **under license** from RioPort.com, Inc. Other marks referenced herein are the property of their respective owners.

Note (1): To take full advantage of the new V.92 standard, your Internet Service Provider (ISP) must be equipped with V.92 modem technology.

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URL: <http://www.businesswire.com>

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Company Names: sonicblue incorporated; SBLU; Diamond Multimedia; RioPort; Bohle Company; News On The Net

Geographic Names: AMERICAS; CALIFORNIA; NORTH AMERICA; USA

Product Names: COMMUNICATIONS TECHNOLOGIES; COMPUTER PERIPHERALS; COMPUTER SOFTWARE; COMPUTERS; CORPORATE; CORPORATE NETWORKS; DATA COMMUNICATIONS; INTERNET; MODEMS; NETWORKS

Event Names: CORPORATE FINANCIAL DATA; DISTRIBUTION CHANNELS; RETAILING; TECHNOLOGY DEVELOPMENT

13/9/15 (Item 15 from file: 610)

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The American Education Corporation Announces Letter of Intent With Tengtu International-Company Will License Technology and Content for China's K-12 and Post-Secondary Educational Markets

Business Wire

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OKLAHOMA CITY, Apr 17, 2001 (BUSINESS WIRE)
- The American Education Corporation (OTC/BB:AEDU) (AEC) today announced that the Company has signed a letter of intent with Tengtu International, Inc. (OTC/BB:TNTU) (Tengtu) of Toronto, Canada, entering into a strategic partnership to market, **sub-license** or deploy its recently released A+nyWhere Learning System(TM) management software, with integrated authoring and assessment tools, for the People's Republic of China (PRC).

Tengtu is a U.S. public corporation that develops and markets educational and entertainment multimedia software and related services through a joint venture and its subsidiaries in the People's Republic of China and Hong Kong. Tengtu is currently partnering with Microsoft China to deliver an interactive software package to approximately 14,000 schools targeted in the PRC's Operation Morning Sun by the Chinese government to bring the benefits of information technology (IT) to selected schools. Tengtu's role in China, through its several joint ventures with Chinese companies such as Legend **Digital** China, is to: (1) Fulfill the government mandate with its Chinese partners to bring the K-12 school system of the People's Republic of China into the twenty-first century with information technology; and (2) Assist the government in achieving the mandate jointly with Tengtu's Chinese corporate

partners to act as the gateway to China's educational and cultural electronic publishing sectors.

Tengtu Chairman & CEO Pak K. Cheung revealed that the new business model of the company reaches beyond its current K-12 base in China, where it markets the Tengtu Total Solution to a universe of 800,000 primary and secondary schools with 200 million pupils, to the huge post-secondary e-learning market in the world's largest nation. "Partnering with American Education will give Tengtu a powerful platform to penetrate the adult education and training market which dwarfs our original K-12 market, which is vast in itself. The A+nyWhere Learning System software engine perfected by American Education is just what we have been looking for in terms of authorability, flexibility and scalability to serve not only our present K-12 clients but also the enormous emerging market for post-secondary education as China tries to catch up with the West," Cheung stated. Additional information on Tengtu and its various China-based joint venture partnerships may be found at www.tengtu.com. These objectives are addressed within China by Tengtu's joint venture, Tengtu United Electronics, Ltd. in which Tengtu owns a 57% interest. The remaining 43% is jointly owned by Beijing Tengtu Culture and Education Development Company, Ltd., which includes the following major Chinese-owned IT corporations as partners: Legend Computer Group, Great Wall Computer Group, Taiji Computer Corporation and Beijing Oriental Lianfa Company, Ltd.

In making this announcement, Jeffrey E. Butler, AEC's Chief Executive Officer, stated: "This is a very exciting development for the Company. The long-range potential of this strategic partnership is significant to the continued development and emergence of American Education as a significant player in the future of e-learning on a worldwide basis. Tengtu approached the Company after learning of the capabilities of AEC's new and recently released Java 2-based learning management system (LMS) software. Tengtu had been searching for some time for technology that had the capabilities, flexibility, authorability and scalable attributes designed into the A+nyWhere Learning System(TM) software engine. Critical to their specifications was an authorable, scalable software-based platform, capable of handling student academic performance data integration with major database providers that would be capable of supporting long-term development and delivery of instructional content in the Chinese language with accompanying specialized assessment testing. Further, the platform had to be suitable for a range of **other** to-be-developed instructional **content**, not only for the K-12 market, but also for the broader adult content needs for training and the post-secondary markets. Simply put, this

arrangement is possible because these features and more are designed into the A+nyWhere Learning System's powerful learning management system engine technology.

Butler continued, "With respect to the future impact of this development on AEC's future financial performance, it is too early to forecast or speculate on potential results. Many details have to be sorted out regarding the final nature of distribution of the financial results of the strategic partnership. Clearly the opportunity is large and, if everything goes according to plan, the future for new potential business is significant and should have a positive impact on the Company's future top line growth and earnings."

The Company's A+nyWhere Learning System and A+SSESS! Version 3.0, released in early 2001 provides for an updated software version to support the Company's extensive curriculum content and skills assessment tools in a fully managed solution that is designed to run over networks and the Internet. This family of educational software products provides an integrated suite of grade level 1-12 software for Reading, Mathematics, Language Arts, Science, Writing, History, Government, Economics and Geography publications. In addition, the Company has developed companion academic skill assessment products, A+SSESS!(TM), to provide educators with the means to more effectively target the use of the Company's curriculum content and to manage for accountability. Spanish language versions are available for Mathematics and Language Arts for grade levels 1-9. The Company's curriculum **content** is electronically **linked** and aligned to the World Book Multimedia Encyclopedia, the leading **reference** encyclopedia for the school market allowing **reference content** from World Book's rich multimedia curriculum-based **reference** material to be accessed directly from A+LS lessons. The A+LS comprehensive family of educational software is now in use in over 9000 schools, centers of adult literacy and correctional institutions.

Note: Certain matters discussed above concerning the future performance of the Company are forward-looking statements intended to qualify for the safe harbors from liabilities established by the Private Securities Litigation Reform Act of 1995. These forward-looking statements can be identified as such by words such as "believes," "anticipates," "plans," "expects" or words of similar import. The future performance of the Company is subject to a number of factors including, but not limited to, general economic conditions, competitive activity and funding available to schools.

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E-mail: jeb@amered.com

URL: www.amered.com
or
Halliburton Investor Relations
Geraldyn DeBusk, 972/458-8000
<http://www.businesswire.com>

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Company Names: microsoft corp.; tengtu international corp.; american education corp.; American Education Corporation; AEDU; Tengtu International Inc; TNTU; Legend Digital China; China-based; Tengtu United Electronics; Beijing Tengtu Culture; Beijing Tengtu Culture and Education De; Education Development Company; Legend Computer Group; Great Wall Computer Group; Taiji Computer Corporation; Beijing Oriental Lianfa Company; World Book Multimedia Encyclopedia; E-mail; News On The Net

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12 Centimeter Multimedia Corp. 3350 Scott Boulevard, Building 61 Santa Clara, CA 95054 800/967-2808, 408/350-9000 Fax 408/350-9012
<http://www.12cm.com>

12 Centimeter Multimedia Corp. (12CM) is the preferred vendor of DVD and CD-ROM encoding and authoring solutions. Services include MPEG-1 and MPEG-2 variable and constant bit-rate encoding; Dolby **Digital**, AC-3, and 5.1-channel mixing; authoring; premastering; graphic design; multiple audio tracks and camera angles; VOB authoring; QuickTime, AVI, MPEG-1 and MPEG-2 file conversion; and in-house master DVD-R creation. Video editing services include a fully **digital** suite and non-linear SoftImage DS. Other services include DVD and CD duplication and packaging, tradeshow, kiosks, Web sites, and consulting.

2netFX 2370-A Qume Drive San Jose, CA 95131 408/232-1691; Fax 408/232-1606 <http://www.2netfx.com>

2netFX is a leading provider of streaming solutions for intranet and broadband Internet media delivery. Founded in 1996, 2netFX is the first to offer multicast streaming of HDTV over ordinary networks. Other services include advanced client player customization and integration and full-featured media server solutions with the lowest latency in the industry. Designed for a variety of applications, including distance learning, corporate communications, government, education, and the military, 2netFX products are currently bundled by many leading **digital** video companies and in use at several organizations, including Sprint, Wal-Mart, Lockheed Martin, Hughes Networks, NASA, U.S. Navy, Lucent, Echo Star, and others.

Accurate Bit Copy 6 Otis Park Drive Bourne, MA 02532 800/696-0500, 508/759-2129 Fax 508/759-5550 <http://www.accuratebitcopy.com>

Based in Massachusetts, Accurate Bit Copy's manufacturing and fulfillment facility is your source for complete turnkey software services. We provide CD-ROM, CD-R, and diskette duplication, along with cost-effective custom packaging solutions, warehousing, inventory control, and shipping. Quality products, quick turnaround, competitive pricing, and unmatched customer service are what differentiate Accurate Bit Copy from other software manufacturers. We will work with you to assure you that each product meets your needs. Let us help you develop your next project. Call us today.

Acutrack 1056-A Serpentine Lane Pleasanton, CA 94566 925/931-9999 Fax 925/931-0162 <http://www.acutrack.com>

Acutrack is your complete production source for all of your CD and DVD needs. Acutrack is there for you on time, every time, with the quality and quantity you need. Acutrack specializes in VideoCD and DVD authoring; CD, CardDisc (business cardshaped CDs), and DVD replication; CD-R silkscreening and duplication; diskette and other media duplication; and printing solutions, packaging, and fulfillment services.

Adaptec, Inc. 801 South Milpitas Boulevard Milpitas, CA 95035 800/442-7274, 408/945-8600 Fax 408/262-2553 <http://www.adaptec.com>

Adaptec is a global leader in innovative storage solutions that move, manage, and protect critical data. The company's products include host bus adapters and controllers, RAID controllers, and CD recording and data protection software for desktops. Adaptec's products are marketed to the world's leading PC and server OEMs, and to end-users through more than 115 distributors and thousands of VARs throughout the world. Technical support is available worldwide. All of Adaptec's products have a foundation in the same quality, reliability, compatibility, and leading-edge technical support that customers have relied on for almost 20 years.

Advanced Media Services 10 Upton Drive Wilmington, MA 01887 800/466-0813, 978/658-1870 Fax 978/658-1877 <http://www.amsstorage.com>

Advanced Media Services designs, manufactures, and supports network storage and data distribution solutions for workgroup and enterprise environments. The AMS Dakota family of NAS servers utilizes thin server appliance technology, which combines optimized hardware, embedded streamlined software, and Web-based management tools in a compact design to deliver superior price, performance, and reliability, and ease of installation, management, and use. They are server-independent solutions providing shared storage resources for clients in heterogeneous network environments. The Dakota server product line includes DakotaROM for storing, archiving, and distributing CD/DVD-ROM data at hard drive performance and DakotaRAID for high-performance file serving.

AEC Media 16057 Mills Avenue San Lorenzo, CA 94580 510/882-4048, 510/813-7818 Fax 510/278-8483 <http://www.aec-media.com>

With years of experience in the media industry, AEC Media provides a one-stop solution for all of your media needs. We supply CD-R, CD-RW, **digital** audio, DVD-RAM, CD labels, and rackmount. We also provide replication and printing services for CD-ROM.

Affex 3740 Campus Drive, Suite 101 Newport Beach, CA 92660
888/992-3339, 949/253-8858 Fax 949/253-8857 <http://www.affex.com>

Affex has been selling its CD printers and accessories since 1996. Affex continues to be a market leader in innovative four-color CD inkjet printers. It is the only company to offer several distinct models to serve the varying needs of its customers, among them its CD-R business card, factory-manufactured, printing solution. All of our printers are designed to print on standard CD-Rs and business card CD-Rs (80mm x 53mm).

Ahead Software GmbH im stoeckmaedle 6 Karlsbad 76307 Germany +49 724 891-1800 Fax +49 724 891-1888 <http://www.ahead.de>

Established in Germany in 1995, Ahead develops software for CD-R/RW and DVD. Ahead's premier software solution, Nero, allows users to create a CD in almost any type of format, including bootable and VideoCDs. Furthermore, Nero offers a wide range of backup and audio options, and can decode and burn MP3 audio files on-the-fly. Ahead's product range includes InCD, a UDF packet-writing solution, and--"brand new" for 2000--Feurio, which is an integrated software for creating audio CDs (especially samplers), and supports simultaneous writing to up to 15 recorders.

AIX Media Group 8455 Beverly Boulevard, Suite 500 West Hollywood, CA 90048 323/655-4116, 323/655-4771 Fax 323/555-8893
<http://www.aixmediagroup.com>

AIX Media Group provides complete DVD production services at its Los Angeles and New York studios. AIX produced the first DVD-Video titles in the spring of 1997, and has completed over 1, 000 titles in all areas, including entertainment, sales and marketing, corporate presentations, education, and training. With in-house 2D and 3D graphics, high-resolution 95kHz/24-bit audio mixing and mastering, video editing, and authoring in DVD-Audio/Video/ROM capabilities, AIX Media Group has the technical and creative experience to handle projects large and small. Selected clients include Motorola, Jive Records, Warner Bros., 20th Century Fox, and BMG.

Alea Systems, Inc. 9689-A Gerwig Lane Columbia, MD 21046
888/654-4925, 410/290-8646 Fax 410/290-8658 <http://www.alea.com>

Maryland-based Alea Systems is an established world leader in CD duplication technology. We manufacture networkable systems for the duplication, printing, and testing of any standard format CD, CD-RW, or DVD. Our CD Forge IV is the most advanced one-button copier, featuring up to thirty 12X hot-swappable CD and DVD recorders. The CD Mill 400 is an autoloading 12X CD copier that can simultaneously record and print CD-Rs. It is network-ready, and will accept images from a variety of locations and store images on its internal hard drive. The standalone system supports from one to eight recorders and two label printers.

Allaire Corporation 275 Grove Street Newton, MA 02456 617/219-2000
Fax 617/219-2008 <http://www.allaire.com>

Allaire Corporation is a leading provider of Internet software products and services for companies building their businesses on the Web. Supported by a community of 450,000 developers and global network partners, the Allaire Internet Business Platform enables tens of thousands of companies worldwide to seize new business opportunities by creating ecommerce, content management, customer service, and business automation systems. Headquartered in Newton, Massachusetts, Allaire has offices in Europe and Asia Pacific.

Allion Computer Inc. 12F, 552, Sec. 5 Chung Hsiao E. Road Taipei Taiwan 11051 +886 2 2728 1717, +886 2 2346 5030 Fax +886 2 2346 5030
<http://www.allion.com>

Allion Computer Inc. is a leading global developer of network computing technologies. Allion also established the NSTL Asia Pacific/Allion Labs, which exclusively provide computer compatibility testing and design-verification test services developed by NSTL and Microsoft, in order to ensure that customer's new products fulfill industrial standards. Founded in 1991, and headquartered in Taipei, Taiwan, Allion presently has 220 employees worldwide. Allion has established branches in major cities worldwide, including Fremont, California;

Brussels, Belgium; Bombay and New Delhi, India; Bangkok, Thailand; and Beijing, China. NSTL Asia Pacific/Allion Labs have also established its testing facilities in China and Japan.

Allstor Software Limited Whiting Way, Melbourn Royston Hertfordshire SG8 6EN UK +44 1763 261516, +44 1763 264438 Fax +44 1763 262575
<http://www.allstor-sw.com>

Allstor Software Limited is a leading provider of library management software and network attached storage (NAS) devices in the mass storage market. With over 10 years' experience in the storage management industry, Allstor Software focuses on product quality and customer service as two key areas to differentiate itself in a crowded market. Allstor Software is headquartered in Melbourn, near Cambridge, England, where the large development team and systems integration laboratory are based, as well as customer support, and sales and marketing for European sales. U.S. sales are supported from Allstor's offices in Colorado Springs, Colorado.

Altiris 387 South 520 West Lindon, UT 84042 801/434-4440,
801/376-4410 Fax 801/434-4441 <http://www.aliris.com>

Altiris develops and markets a full line of PC management and deployment solutions designed to minimize the cost of deploying, maintaining, migrating, and teaching with PCs. Headquartered in Lindon, Utah, Altiris markets and sells its solutions worldwide.

Amaray Media Packaging 5 Princewood Road Corby Northants N17 4AP UK +44 1536 263653 Fax +44 1536 203537 <http://www.amaray.com>

With its parent company tracing its history back some 100 years, Amaray has been providing European clients with injection-molded packaging solutions for VHS and optical disc formats for some 20 years. Amaray are the original designers and global licensors of the Amaray DVD-Safe library case, the popular format for the rapidly growing DVD-Video format. Fulfillment of DVD-Safe is fully automatable by a range of high-speed packing machines. The cost benefits associated with this, together with its durability and aesthetic properties, have resulted in its adoption as the next generation of packaging for PC and console-based games formats, including PlayStation2.

Ameri-Media.Com, Inc. 3977 MT Highway 35 Kalispell, MT 59901
406/755-8618, 406/755-8618 Fax 406/756-5174 <http://www.ameri-media.com>

Ameri-Media.Com, Inc. was founded with a simple business philosophy: Provide each client the best system solutions and highest quality of production available with unparalleled service and support. Our goal is to become your business partner: a partner that can give you an important edge in our competitive global markets. We specialize in B2B, B2G, and B2C markets. Our product line consists of CD/DVD duplicators, CD/DVD jukeboxes, DVD-RAM, media printers, media, and accessories from such names as: MicroBoards, Cedar, Pioneer, Hitachi, Plector, Hoei Sangyo, and Champion.

Americ Disc Inc. 355 Suite Catherine Ouest Montreal, Quebec H3B 1A5, Canada 514/745-2244, 888/666-6096 Fax 514/745-7650
<http://www.americdisc.com>

Americ Disc is a major North American provider of CD/DVD manufacturing services and other optical disc media. Americ Disc is jointly owned by Transcontinental Group of Montreal and MPO of France. The MPO/Americ group is one of the world's largest independent CD manufacturers with facilities in Europe, Asia, and North America. Americ Disc has manufacturing facilities in California, Florida, and Canada, as well as service and distribution centers in Minnesota and Montreal. Through its 16 North American sales offices, Americ Disc offers disc replication services as well as printing, assembly, packaging, shipping, and distribution.

American Pro **Digital**, Inc. 9772 State Highway 56 Masse,
NY 13662 800/273-3472, 315/769-0034 Fax 315/769-0342
<http://www.apd-disc.com>

American Pro **Digital**, Inc. offers high-quality and rapid turnaround CD-ROM and DVD replication services. APD's newest service offering includes CD-R duplication using Microtech's Image Automator CD publishing system, and Primera's Signature III inkjet printer capable of

1200dpi quality. We use the absolute best in inkjet-printable CD-R media and we offer same-day, 24-, 48-, and 72-hour turn options. From premastering to graphics and printing, APD services your onestop CD replication needs.

AmpliVox Sound Systems 3149 MacArthur Boulevard Northbrook, IL 60062 847/498-9000 Fax 847/498-6691 <http://www.ampli.com>

AmpliVox Sound Systems designs, engineers, and manufactures elegant wood lecterns and portable sound systems that have a three-year warranty, are "Made in the USA", and are UL/CUL listed (File # E37772). AmpliVox ready-to-speak sound systems include a 50-watt multimedia stereo amplifier, built-in wireless receiver, Jensen speakers, and a professional microphone. Every sound system/lectern can reach audiences of up to 5,000 people in areas from 200 to 20,000 square feet both indoors and outdoors. CEO Don Roth says, "Our dedication to quality and reliability with versatile solutions to your audio presentation needs, makes AmpliVox Sound Systems the industry leader serving the presentation marketplace."

ASACA Corporation 400 Corporate Circle Golden, CO 80401 303/278-1111 Fax 303/278-0303 <http://www.asaca.com>

ASACA's 30-year experience in highdensity storage and its commitment to providing complete solutions have produced the TeraCart **Digital** Virtual Library (DVL). TeraCart is a family of advanced DVD-RAM libraries that provide high-capacity, rewritable storage and an exceptionally low storage cost in a single unit. Offering SAN and NAS support, the ASACA DVLs can be configured from 1 to 24 DVD-RAM drives for online capacities ranging from 7.8TB to 15.5TB. Up to eight libraries can be connected with pass-through and infrared communications. Expansion cabinets can be configured with up to 192 DVD-RAM drives, and up to 11,600 double-sided DVD-RAM discs to provide 60.3TB of storage.

Ashby Industries, Inc. 9500 Westgate Road, Suite 205 Oklahoma City, OK 73162 405/722-1705; Fax 405/722-1771 <http://www.ashbyind.com>

Serving the media duplication market since 1983, Ashby manufactures automated CD and diskette duplication equipment, and provides complete duplication services.

Asimware Innovations Inc. 600 Upper Wellington Unit D Hamilton, Ontario L9A 3P9, Canada 905/575-1042; Fax 905/575-0095 <http://www.asimware.com>

Asimware Innovations Inc. is a privately-owned corporation founded in Hamilton, Ontario, Canada in 1992 and incorporated in 1995. We specialize in CD and DVD optical technologies, and have released a number of highly acclaimed products in these areas. Our primary objectives are to offer world-class CD and DVD recording software and high-quality product support for a variety of platforms. Asimware Innovations Inc. is committed to offering clear and viable alternatives to the software solutions that are currently available in the market. Asimware's current product offerings include HotBurn and HotBurn ProCD mastering software.

askSam Systems 121 South Jefferson Perry, FL 32348 800/800-1997, 850/584-6590 Fax 850/854-7481 <http://www.asksam.com>

askSam Systems is a privately-held company that specializes in making information accessible. askSam Systems develops and markets information management and distribution tools for microcomputers, askSam, a free-form database, combines database, word processing, and text-retrieval functions offering a flexible approach to managing all types of information, regardless of the source. Designed for IBM PC-compatibles, the askSam family of products include askSam, the freeform database, the askSam Web Publisher, the askSam Electronic Publisher, and SurfSaver, a filing cabinet for Web pages. The askSam database engine is also available for developers to create special applications.

Aspen Packaging Corporation 1200 St. Charles Street Elgin, IL 60118 800/367-5493, 847/608-2500 Fax 847/608-4600 <http://www.aspenpkg.com>

Aspen is a custom designer and manufacturer of paperboard specialty packaging. Aspen provides interesting packaging solutions for software, CD, VHS, literature, and promotional items. Aspen combines printed paperboard

with CD trays, soft-grip foam dots, and corrugated litho to present a variety of packaging options. Call or email for a free Aspen Advantage kit!

AudioDev AB Kabingatan 9, MAImo SE-21239 Sweden +46 40 690 4910, +46 40 690 4900 Fax +46 40 690 4990 <http://www.audiodev.com>

AudioDev provides quality control solutions for the optical media industry. CATS systems are built with the highest demands on measurement accuracy. The CATS family includes analyzers for DVD, DVD-R, DVD-RW, CD, CD-R, and CD-RW, as well as stamper testers and a birefringence tester. TestCenter is a service that provides independent tests and analysis.

Bags Unlimited, Inc. 7 Canal Street Rochester, NY 14608
800/767-2247, 716/436-9006 Fax 716/328-8526 <http://www.bagsunlimited.com>

Bags Unlimited has 25 years' experience providing excellent storage, display, and shipping products for CDs, vinyl, prints, comics, posters, magazines, postcards, etc. Bags are high-clarity polyethylene, polypropylene, and mylar, while plastic and cardboard corrugated boxes are available for storage and display. We offer standard, double, quad, six-CD, center-hinged, side-hinged, slimline, and ultra slimline CD cases, as well as paper sleeves for CDs, LPs, 45s, and 78s. Backings are chipboard, acid-free board, matboard, corrugated cardboard, and foamcore, and mailers are Jiffy, rigid envelopes, and corrugated shippers. Bags Unlimited offers in-house printing on bags with 2-3 week delivery time.

BakBone Software, Inc. 10145 Pacific Heights Boulevard San Diego, CA 92121 858/450-9009 Fax 858/450-9929 <http://www.bakbone.com>

BakBone Software is an international storage management company headquartered in San Diego, California, with additional offices throughout the U.S., as well as the United Kingdom and Japan. BakBone develops and globally distributes innovative, integrated storage management software, and nearline archival products.

BARCO Projection Systems Inc. 3240 Town Point Drive Kennesaw, GA 30144 770/218-3200, 770/218-3216 Fax 770/218-3250 <http://www.barco.com>

BARCO Projection Systems is a global leader in the development and manufacturing of high-performance, large-screen projection systems. The company's products utilize a diverse array of cutting-edge CRT, LCD, DLP, and LED display technologies. BARCO is also actively involved in developing custom product solutions tailored to the specialized needs of a broad range of customer applications. As a result, BARCO is able to deliver the widest and most comprehensive product line of large-screen display systems on the market today. A specialized distribution network in over 95 countries worldwide allows BARCO to respond quickly to local customer requirements.

Belden Electronics Division 2200 US Highway 27 South Richmond, IN 47374 800/235-3361, 800/235-3362 Fax 765/983-5294 <http://www.belden.com>

Belden Electronics Division is the world's largest manufacturer of professional audio and video cable. Belden also produces extensive lines of broadband/CATV and premise/ data (Category cables), as well as thousands of other types of wire and cable. Belden has been in business since 1902.

Blackbourn Media Packaging 200 4th Avenue North Edgerton, MN 56128 800/842-7550, 507/442-3642 Fax 507/442-4313 <http://www.blackbourn.com>

With over 40 years in the media packaging industry, Blackbourn Media Packaging is a company you can trust with your business. With a company-wide commitment to achieving customer satisfaction, we offer custom design capabilities and more than 70 items in stock--many of which can be shipped the same day ordered. Blackbourn Media Packaging offers superior products, innovative design and decorating capabilities, quick turnaround, and responsive and personal customer service. Blackbourn Media Packaging takes pride in our many services and products which are provided to customers worldwide.

C-Line Products, Inc. 1100 Business Center Drive Mount Prospect, IL 60056-5053 800/323-6084, 847/827-6661 Fax 847/827-3329 <http://www.C-LineProducts.com>

C-Line Products, Inc. is a manufacturer of plastic storage, identification, and organization items, and a well-known name in the office products industry. With over 50 years of experience, C-Line's many

offerings include media storage products, such as Zip disk, diskette, and CD/DVD holders. These products come in both self-adhesive and ring binder styles. Other products include sheet protectors, name badges and holders, report covers, project folders, photo holders, and office accessories. C-Line's Custom Order department can also manufacture products to meet your exact specifications. We would be happy to provide you with a quote on your specific project needs.

Calumet Carton Company 16920 State Street South Holland, IL 60473
708/333-6521 Fax 888/333-8540 <http://www.calumetcarton.com>

Calumet **Digital** Packaging is the most elegant, affordable, and practical solution to shipping or displaying your CD-ROM or diskette. With a wide range of stock sizes and designs, chances are we make a package that fits your needs. If not, you can work together with our expert engineers to create a custom package that's effective for any application. Because most Calumet packaging is made entirely of recyclable paperboard, the printing possibilities are endless.

Canon USA, Inc. One Canon Plaza Lake Success, NY 11042 800/OK-CANON,
516/328-5000 Fax 516/328-5559 <http://www.usa.canon.com>

Canon USA's Image Filing Systems Division provides the latest document management technology. From our revolutionary CD-R imaging system and unique desktop scanners to the latest in micrographic and hybrid systems, we offer advanced systems that can capture, store, and retrieve images. So whether your needs include a complete turnkey system, or even peripherals to compliment an existing system, let us demonstrate a solution for your imaging needs.

Canopus Corporation 711 Charcot Avenue San Jose, CA 95131-2208
408/954-4500 Fax 408/954-4504 <http://www.justedit.com>

Canopus Corporation manufactures award-winning, non-linear video editing, MPEG-2 encoding, DVD authoring, and 3D DVE products for video professionals and enthusiasts. The company's DVD authoring solution, Amber for DVD, combines Canopus' MPEG-2 encoder with Spruce Technologies' DVDVirtuoso authoring software to provide a comprehensive, affordable DVD authoring system that delivers the high-quality video and audio MPEG-2 output essential for DVD authoring.

CareWare Multimedia Ltd. R. Cardeal Arcoverde, 1641 8 Andar Sao Paulo SP 05407-002 Brazil +55 11 3819 1999, +55 11 3819 2131 Fax +55 11 3819 5666 <http://www.careware.com.br>

CareWare is a complete DVD authoring service company.

CD Associates 15-A Marconi Irvine, CA 92618 949/588-3800; Fax 949/588-3805 <http://www.cdassociates.com>

CD Associates offers simple to use and easy to calibrate CD, CD-R, and DVD analyzers and testing equipment, which detect problems in process. CD Associates has engineered and introduced many firsts, including the industry's first stamper analyzer, 2X testing capability, the industry's first stamper-to-source verification analyzer, the industry's first affordable DVD and DVD stamper analyzers, the worlds fastest playability testing (CDA3000), and the first DVD Quicktest (Up to 10X) and network-capable testing system. CD Associates is your partner in the quest for higher yields.

CD CyClone Duplication Systems 20472 Crescent Bay Drive #108 Lake Forest, CA 92530 949/470-4795 Fax 949/470-4796 <http://www.cdyclone.com>

CD CyClone Duplication Systems is an innovative developer of software and hardware products for the growing CD-R, CD-RW, duplication, and replication markets. CD CyClone has a commitment towards developing efficient, easy-to-use, and cost-effective CD technology products that fulfill our customers' requirements for reliable CD production, duplication, and distribution of data, software, audio, and multimedia.

CD Dimensions Inc. 20 Research Parkway Old Saybrook, CT 06475
888/395-6396, 800/395-6396 Fax 860/395-6399 <http://www.cddimensions.com>

Established in 1995, we specialize in offering best-of-breed CD-R, DVD, and network storage products and solutions from the industry's leading manufacturers through our informative Web site. Product offerings include

high-quality CD-R media, CD-R, and DVD-R duplication and printing solutions, DVD authoring tools, jukebox and tower systems, RAID, NAS, and tape libraries.

CD/DVD Playright 6339 Long Suite C Shawnee, KS 66216 800/800-8879, 913/631-2284 Fax 913/631-3339 <http://www.cdplayright.com>

CD/DVD Playright are the makers of Quick Shield, the only accessory that protects your media from the effects of routine handling. Simply spray it on and wipe it in. Quick Shield and our patented repair kits work together to provide the optimum in DVD and CD-R blank productivity and long media life. These products are bundled in gift packs called Trio for optical media and retail for about \$25. They are fully tested by experts and have earned numerous awards and write-ups. Protect and defend all formats of optical media with Playright products!

CD ROM, Inc. 7385 Bush Lake Road Edina, MN 55439 952/832-5424, 866-66CDROM Fax 952/832-5434 <http://www.cdrominc.com>

CD ROM, Inc. was incorporated in 1988. The three purposes of the company were then and remain today: To distribute quality optical products; to develop CD-ROM/DVD products for clients in our consulting branch; to foster research and development of the optical industry. Our company formed a consulting division in 1990 called CD ROM-USA, Inc. We also hold patents on CRI-X3:CD ROM/DVD compression software and DX-CD:CD-ROM destruction device, electric, and manual models. We build custom CD and DVD systems.

CD Solutions, Inc. 100 West Monument Street Pleasant Hill, OH 45359-0536 800/860-2376, 937/676-2376 Fax 937/676-2478 <http://www.cds.com>

From the smallest need to the largest, we can handle what you've got. We do short runs, fast runs, and large runs. We do in-house duplication, and we also sell duplication equipment for your in-house needs. We have robotic systems, CD printers, CD towers, media, and more. We can help you determine the best equipment for your needs.

CD\Works 1266 Soldiers Field Road Boston, MA 02135-1003 617/782-5884; Fax 617/782-5925 <http://www.cdworks.com>

CD\Works is your complete resource for **digital** media production. We offer quick turn-around CD, DVD, business card CD, and shaped CD production. We can give you whatever assistance you require to produce your project successfully. CD\Works creates CDs, DVDs, and shaped CDs for any purpose and in any quantity. We provide same-day service for low-volume CD-R Duplication at no extra charge. We also provide fast turn around times on CD and DVD replication. CD\Works has been the number one CD production service in Boston, Massachusetts since 1993.

CD-Robotics 1032 Serpentine Lane Pleasanton, CA 94566 877/259-9511, 925/417-2900 Fax 925/417-2903 <http://www.cd-robotics.com>

CD-Robotics manufactures and distributes automatic CD-R duplication equipment. Products range from the smallest, least expensive mini-CD auto-copier to the fastest Simultaneous Auto-Loading Tower SALT-8 production machine, equipped with a choice of printers and a 1,000-CD capacity. For medium-range duplication needs, the company offers the Spinmaster 5, equipped with five drives, a choice of printers, and a 600-CD capacity. The basic system is the CD-QT equipped with one drive and a choice of printers with a 200-CD capacity.

CD-ROM-WORKS 139 NW 2nd Portland, OR 97209 800/652-7194, 503/219-9331 Fax 503/254-4830 <http://www.cd-rom-works.com>

CD-ROM-WORKS offers duplication and replication of CD and DVD discs with many packaging solutions. We also offer business card CDs, three-inch CDs, and other custom CDs, as well as authoring and design services.

CDROM2GO.COM 21430 North 20th Avenue Phoenix, AZ 85027 877/99-CDROM, 623/587-4900 Fax 602/294-6433 <http://www.cdrom2go.com>

CDROM2GO.COM provides comprehensive optical media solutions through their Internet channel, and a national franchise network. A manufacturer direct source for CD replication, CD duplication, and CD shaping, they deliver wholesale DVD-R and CD-R media, CD business cards, CD packaging, CD printers, and duplication equipment, as well as accessories and fulfillment services.

Cedar Technologies 7725 Washington Avenue South Edina, MN 55439
952/944-8144; Fax 952/944-7808 <http://www.cedartechnologies.com>

Cedar Technologies, a division of Rimage Corporation, provides the industry's best value for the office environment. Originators of the Cedar Desktop CD-R Publisher, the Cedar product family now offers the Network Publisher products that provide network-ready, plug-and-play CD-R production equipment in a compact, office-friendly footprint. Users can now enjoy the freedom of automated, network integrated CD-R production at an affordable price.

Centis Custom Products Division 205 South Puente Street Brea, CA
92821 800/767-0778, 714/441-4500 Fax 800/733-7466
<http://www.centiscustom.com>

Centis Inc., established in 1954, is a global leader of information packaging with over 1,700 employees and manufacturing facilities in three countries. Centis Custom Products Division manufactures the world's largest selection of vinyl and poly-disc storage pages and sleeves with auto insertion production capabilities. Our made-to-order solutions include disc protection, wallets, desktop, library systems, and promotional packaging in a wide array of materials, techniques, and construction, including adhesive-backed, adhesive permanent closures, adhesive reusable closures, auto-insertable, capacity choices, **digital** print, foil-stamping, mailers, non-woven, offset print, poly, ring binders, silkscreen, tamper-resistant, vacuum-form binders, vinyl, and zipper closures.

Chess Archiving Technology (Chess AT Inc.) 26071 Merit Circle, Suite 108 Laguna Hills, CA, 92653 800/722-7748, 949/582-1946 Fax 949/582-3706
<http://www.smartdax.com>

Chess AT Inc. represents the leading manufacturer of network attached data archives for CD and DVD. The Chess AT technology and system architecture is sophisticated and unique in the world of data archiving. Still it is an open and transparent architecture so everyone can use the smartDAX products in their own specific application. Chess AT and Chess DAX are both part of the Chess Group, founded in 1987, which has its headquarters in the Netherlands. Chess is represented in the whole of Europe by Chess DAX, and in the USA by Chess AT.

Cinram 4905 Moores Mill Road Huntsville, AL 35811 800/433-3472,
765/569-5985 Fax 256/852-8706 <http://www.cinram.com>

Cinram is the pre-eminent choice for DVD authoring and CD, CD-ROM, DVD, audiocassette, and videocassette duplication, offering full turnkey services, including all packaging, distribution, and fulfillment with direct-to-retail shipping. Cinram works with motion picture studios, music labels, publishers, software companies, and corporate communicators around the globe with facilities in the U.S., Canada, Europe, and Latin America. Cinram International Inc. is one of the world's foremost independent manufacturers of prerecorded multimedia products. Cinram is a public company traded under TSE & ME Symbol CRW, and NASDAQ Symbol CNRMF.

Clarity Visual Systems, Inc. 9025 SW Hillman Court #3122
Wilsonville, OR 97070 503/570-0700; Fax 503/582-8570
<http://www.clarityvisual.com>

Clarity Visual Systems provides Visual Messaging Solutions, including **digital** displays, media controllers, and software, and systems integration for business-to-business and business-to-consumer applications.

Clary Corporation 190 South Walker Avenue Monrovia, CA 91016
800/44-CLARY; Fax 626/305-0254 <http://www.clary.com>

Clary Corporation has pioneered the concept of continuous, uninterruptible power systems for mission-critical applications. When the power absolutely cannot go off, the entire world turns to Clary. Clary equipment is found in hospitals, oil fields, rugged industrial applications, traffic signals, computer networks, military systems, and numerous other applications. Clary is the only company with 510(k) FDA certification to provide continuous power for devices, such as a Heart-Lung or other profusion system machines.

Color Film **Digital** Media 770 Connecticut Avenue Norwalk,
CT 06854 800/882-1120, 203/866-1120 Fax 203/854-3526
<http://www.colorfilm.com>

Color Film **Digital** Media provides complete turnkey solutions for your media replication needs. We have built upon our 50-year commitment to quality by recently expanding our customer service department. This ensures each of our clients prompt and professional service. Services include audio and videotape duplication, slide duplication, CD-R, CD-ROM, CD-Audio, business card CD, and DVD replication. We offer complete printing and packaging services.

ComLab, a division of Winnercomm, Inc. 6120 South Yale, 2nd floor
Tulsa, OK 74136-4229 918/496-1900; Fax 918/499-5420
<http://www.winnercomm.com>

ComLab recognizes the fact that companies and organizations are forced to work with many different agencies and studios in order to complete their branding, marketing, and communication strategies, which results in an incohesive and ineffective collection of materials that rarely achieve consistent results. We put our design sensibilities and working dynamics into the creation of effective mixed-media campaigns. Through our range of services, which include CD-ROM and DVD design and development, corporate identity systems, video services, interactive design, Web site development, and graphic design, we are able to provide the necessary bridge between traditional forms of communication and new media.

Compaq Computer Corporation 20555 SH 249 Houston, TX 77070-2698
719/548-3544; Fax 719/548-3292 <http://www.compaq.com>

Compaq Computer Corporation, a Fortune Global 100 company, is the largest supplier of computing systems in the world. Compaq designs, develops, manufactures, and markets hardware, software, solutions, and services, including industry-leading enterprise computing solutions, fault-tolerant business-critical solutions, and communications products, commercial desktop and portable products, and consumer PCs. Compaq products and services are sold in more than 200 countries directly to businesses, through a network of authorized Compaq marketing partners, and directly to businesses and consumers through Compaq's ecommerce Web site. Compaq markets its products and services primarily to customers from the business, home, government, and education sectors.

ComView Visual Systems 972 Cobb Place Boulevard, Suite 216 Kennesaw,
GA 30144 678/819-5201 Fax 678/819-5204 <http://www.comview-vs.com>

Founded in 1996, ComView Visual Systems is a global market leader in the development, production, and delivery of large-scale multimedia displays with unparalleled resolution and uniformity. Based on its unique proprietary optical image processing and sophisticated software technology, ComView specializes in supplying optimal solutions using **digital** projection technology. ComView systems can expand HDTV resolution images to the size of any wall with the same clarity, brightness, and detail. ComView offers both front and rear-projection systems--scalable to any size and configuration--that can display a wide variety of input sources and content. The ComView product line consists of ViewBoard, ViewScreen, ViewMaestro, and WideStation.

Coptech Inc. 106 Cummings Park Woburn, MA 01801 800/934-1560,
781/935-2679 Fax 781/935-7673 <http://www.coptechinc.com>

Established in 1986 as a 9-Track tape duplicator, Coptech Inc. has evolved into a leading provider of CD-R screen printing and duplication services. With a daily capacity of 25,000 screen-printed units, 5,000 duplicated units, in-house graphic design, and content development, Coptech delivers quick-turn, high-quality, high-quantity duplicated, and screen-printed CD-Rs to the software, graphic arts, marketing, communications, and music industries. In addition, Coptech offers diskette and tape duplication, CD-ROM replication, and conversions from legacy media types to CD.

CopyPro, Inc. 4020 Pike Lane, Concord, CA 94520 800/887-9906,

925/689-1200 Fax 925/689-1263 <http://www.copyprom.com>

CopyPro is a leading provider of CD-R and DVD-R duplication and labeling systems. CopyPro offers desktop duplicators up to a 1,000-disc capacity in standalone, PC-based, and network publishing models.

Costas Systems 2503 Vineyard Avenue Pleasanton, CA 94566
877/259-9511, 925/417-2900 Fax 925/417-2903 <http://www.cd-robotics.com>

Costas Systems offers the CD-QT, a one-drive system with a 200-CD capacity and choice of printers, and the Spinmaster, a five-drive system with a 600-CD capacity. Both are established products offered to OEMs and VARs, or **under license**. The latest SALT-8, Simultaneous Auto Loading Tower is the most powerful duplication system available. The patent-pending robotics allow the drives to write without waiting for the load/unload cycle. The 1,000-CD capacity, combined with a choice of thermal printers, make it the ultimate production machine. Products are being offered fully equipped or bare bones for VAR and OEM.

CPC 1010 Rockville Pike, Suite 306 Rockville, MD 20852 800/977-6678, 301/738-8487 Fax 301/738-8488 <http://www.cpcweb.com>

CPC develops and sells closed-captioning and subtitling software that works with all video formats, including DVD. The software can even take captions from analog tapes (like BetaSP) and automatically place them onto DVD as either closed captions or subtitles. CPC also operates a closed-captioning and subtitling service, and develops and sells Crossover Link software for WebTV and V-Chip software that allows program producers to place multiple ratings onto a single program.

Creative Labs, Inc. 1901 McCarthy Boulevard Milpitas, CA 95035
408/546-6965, 408/930-1725 Fax 408/432-0533 <http://www.creativelabs.com>

Creative Technology, Ltd. is a global leader in PC entertainment products. It was founded in Singapore in July 1981. Best noted for its award-winning Sound Blaster line of audio cards, the Sound Blaster Live Over time, Creative has built upon the popularity and demand of its PC audio success to include graphics, DVD, computer telephony integration (CTI), communications, and video-conferencing. Today, Creative expands the power of the personal computer with Personal **Digital** Entertainment Internet (PDE) solutions, comprising desktop products, Internet appliances, and Internet applications and services.

Crest National Optical Media 6721 Romaine Street Hollywood, CA 90038
800/309-DISC, 323/860-1300 Fax 323/466-7128 <http://www.crestnational.com>

Crest National, established in 1961, is a service provider for the entertainment industry. Services include MPEG compression and DVD authoring; full DVD/CD manufacturing; 16mm and 35mm motion-picture film processing; skip bleach processing; reversal cross processing; dailies/work prints; video dailies and non-linear offline editing; motion-picture film, video and audio restoration; 65/70mm, 35mm, and 16mm **digital** telecine with pogue color correction; analog, **digital** composite and component videotape editing; video duplication in all formats; standards conversion; complete audio services; and foreign language dubbing and subtitling.

Crush **Digital** Video 147 West 25th Street, 4th Floor New York, NY 10001 212/989-6500 Fax 212/645-9093 <http://www.crushdigital.com>

Founded in 1996, Crush **Digital** Video was the first DVD studio in New York. The Crush team performs a broad range of **digital** services, including DVD authoring for feature films and music videos, streaming video, 5.1 surround audio services, DVD-Audio services, interactive menu design, business presentation and kiosk services, and DVD consulting. Crush is the winner of the 1998 and 1999 DVD Discus Award "Best Corporate DVD Video" for the 411 **Digital** DVD directory.

Cutting Edge 8191 Center Street La Mesa, CA 91942 619/667-7888 Fax 619/667-7890 <http://www.cuttedge.com>

Cutting Edge is a leading developer and provider of network storage solutions, including storage-area networks (SANs), network-attached storage (NAS), CD/DVD-ROM servers, CD/DVD-ROM towers, CD recording systems,

jukeboxes, libraries, and fully fault-tolerant RAID arrays. We can provide any amount of storage from a few hundred megabytes to hundreds of terabytes. We specialize in custom-configuring total solutions to your exact specifications.

Cyber-Shape, Inc. 69 Brunswick Avenue Moosup, CT 06354 800/894-3472, 860/564-6610 Fax 860/564-5654 <http://www.cyber-shape.com>

Cyber-Shape, Inc. provides replication and shaping of business card and credit card CDs. We also provide custom shaped CDs and 3" mini-CDs, as well as content development services for these innovative marketing and promotional items.

Cygnet Storage Solutions, Inc. 1745 McCandless Drive Milpitas, CA 95035 800/7-CYGNET, 408/954-1800 Fax 408/954-9017 <http://www.cygnet.com>

Cygnet Storage Solutions, Inc. is a leading manufacturer of small, medium, and high-capacity CD/DVD systems for archival storage, data distribution, **digital** asset management, and Web-based applications. Cygnet's product line includes infinidISC+ optical disc jukebox with DVD or CD drive technologies, CD autoloading duplicators, DVD-ROM drive towers, infininet network-attached storage connectivity, and infiniraid accelerated throughput storage devices. To enhance the features of Cygnet's hardware products, a suite of enabling software applications for a number of vertical markets, including banking, government, pre-press, publishing, healthcare, and entertainment/broadcasting are available. Cygnet has been instrumental in ushering DVD-RAM storage and archival solutions into the storage industry mainstream.

Cypress Corporation 2935 Waterview Drive Rochester Hills, MI 48309 248/852-0066; Fax 248/852-7025 <http://www.cypressdelivers.com>

Cypress Corporation provides output management, search, retrieval, and viewing through its Cypress Integrated Document Server. Cypress is designed to manage disparate documents in the enterprise, and over the Internet, as if all of the documents were created on the same system and stored in a common archive. Cypress is the leading document output, management, search, retrieval, and viewing software for companies with mission-critical document application needs. With more than 17 years of experience, Cypress Corporation serves its customers, including dozens of Fortune 1,000 companies and governments, through its offices in the U.S., U.K., Brazil, and its partner resellers.

Daikin US Comtec Laboratories 999 Grant Avenue Novato, CA 94945 415/893-7800; Fax 415/893-7807 <http://www.daikindvd.com>

Daikin US, the world leader in DVD software tools, is the center of operations for R&D, marketing, sales, and support for the renowned series of DVD authoring and support tools--Scenarist, Scenarist Off-Line, Scenarist EDK, ReelDVD, DVD Informer, ROM Formatter, and DVD Presenter. Daikin's products are the DVD solution of choice for the vast majority of multimedia content developers worldwide. In fact, more than three-quarters of all DVD titles produced to date have been authored with Daikin's authoring tools. Daikin has additional R&D offices in Japan and Canada, and sales and support offices in Europe, Canada, Japan, and Singapore.

Datalink Corporation 7423 Washington Avenue South Minneapolis, MN 55439 800/448-6314; Fax 952/944-7869 <http://www.datalink.com>

Datalink Corporation (NASDAQ: DTLK) is an independent provider of networked data storage solutions for open-systems computing environments. Datalink designs systems to store, access, and protect business-critical information across a variety of computing platforms. These systems enable IT organizations from companies of all sizes to access reliably and efficiently the data needed to operate these organizations on a daily basis. Datalink, founded in 1963, is headquartered in Minneapolis, Minnesota, and has operations in 21 locations, including Arizona, California, Colorado, Florida, Georgia, Illinois, Indiana, Massachusetts, Michigan, Missouri, New York, Oregon, North Carolina, Tennessee, Virginia, Washington, Washington DC, and Wisconsin.

DaTARIUS

Anton Maria Schyrle-Strasse 7 Reutte, Tyrol 6600 Austria +43
5672-206410, +43 5672-2060 Fax +43 5672-206-8000 <http://www.datarius.com>

DaTARIUS, previously known as KOCH Test Equipment, designs high-tech tools for quality control and process management and has an established reputation within the optical media industry. Key players of the replication scene check their CD and DVD stampers and replicas with DaTARIUS test equipment and belong to our major customers. We are a truly international team, with people from Germany, the U.S., the Netherlands, and Belgium. In order to be able to serve customers worldwide, we have offices in Hong Kong and in the United States, and representatives and distributors in every corner of the world.

Datasis Corporation 1687 Elmhurst Road Elk Grove, IL 60007
800/533-4646, 847/427-0909 Fax 847/427-1919 <http://www.datasis.com>

Datasis Corporation provides a full range of **digital** media services, including CD, DVD, and diskette duplication. Datasis Corporation also provides video digitization services to CD and DVD, and MPEG-1/2/4 AVI, and QuickTime support.

DCA, Inc. (Doug Carson & Associates) 1515 East Pine Street
Cushing, OK 74023-9161 918/225-0346 Fax 918/225-1113 <http://www.dcainc.com>

Doug Carson & Associates, Inc. (DCA) is the industry-leading provider of world-class signal processing technology. Since 1988, CD and DVD manufacturers worldwide have relied on DCA's premastering, mastering, and verification products for optical discs, including copy-protected discs. DCA's products include Mastering Interface System (MIS), Signal Verification System (SVS+), Integrated Network Mastering System (INMS), and now ShopTalk--the enabling technology for plant automation.

Deluxe Specialty Printing 6419 Lakesunrise Drive Ruskin, FL 33572
813/541-7006 Fax 813/247-5335 <http://www.deluxedisc.com>

Since 1979, Deluxe Specialty Printing offers the finest in plastic printing, CD media printed in 5-7 days after receipt of approved art. Your discs are printed on our quality discs that are already in stock. Four-color process jobs are no problem, and we offer same-day delivery. We can burn and mail all under one roof. Contact us today for free samples of our work. We continue to print credit cards in 5-7 days with complete in-house embossing and mailing services.

DiamondBox 5203 Leesburg Pike, Suite 907 Falls Church, VA 22041
800/463-6611 703/575-3442 Fax 703/575-3456 <http://diamondboxusa.com>

DiamondBox, made in the Netherlands, is a patented crush-proof replacement for the traditional jewel case. Ultra-lightweight, yet super-strong, the case holds any CD, CD-R/RW, or DVD by means of its patented fingers. DiamondBox is DVD safe and saves on mailing costs.

The Richard Diercks Company, Inc. 420 North 5th Street, Suite 300
Minneapolis, MN 55401 612/334-5900 Fax 612/334-5907
<http://www.dvdauthor.com>

One of the world's most experienced DVD developers and authoring houses with over 400 titles completed in the past four years. Pioneering work done with DVD-Hybrid and DVD-ROM features (screen savers, Web links, search, print, download). Created multiple DVD demo programs and world's first DVD-18 (Aquaria). Multiple encoding, authoring, Surround Sound stations. Full graphics, animation services. Feature films, special interest, corporate.

Digital Matrix Corporation 67 Whitson Street Hempstead,
NY 11550 516/481-7990 Fax 516/481-7320 <http://www.galvanics.com>

Digital Matrix is a global market leader in turnkey installations of electroforming (galvanics) systems for CD, CD-R, and DVD stamper manufacturing. The company works with all mastering systems and is best known for innovative StamperForming systems, advanced software controls, remote diagnostics, and customer service. Standalone, modular, and small footprint solutions are available.

Digital Projection, Inc. 55 Chastain Road, Suite 115
Kennesaw, GA 30144 770/420-1365 Fax 770/420-1360
<http://www.digitalprojection.com>

Digital Projection, Inc., an Imax company, is a manufacturer of ultra-bright 3-chip DLP projectors for large-screen theatrical, multimedia, entertainment, and presentation applications. The company's product line includes 11 Power, Lightning, and Highlite display projectors, which are offered in a variety of brightness and resolution combinations of up to 12,000 ANSI Lumens.

DISC, Incorporated 372 Turquoise Street Milpitas, CA 95035
800/944-3472 408/934-7000 Fax 408/934-7007 <http://www.disc-storage.com>

DISC, Incorporated builds storage devices that add capacity to networks for a fraction of the cost of RAID.

DiscFarm 425 North Smith Avenue Coro, CA 92880 909/279-4034 Fax 909/279-4038 <http://www.discfarm.com>

Anything that has to do with discs, DiscFarm is the place to call. DiscFarm provides a total solution service for all CD/ DVD applications. The DiscFarm total solutions service includes everything from providing raw CD-R and DVD-R media to replication, silkscreen printing, and packaging. DiscFarm also specializes in custom-cut CDs and DVDs, which allow the customer to cut the discs into any shape they desire. DiscFarm also produces its own line of high-performance duplication towers. DiscFarm performs all processes in-house, assuring the highest quality control, swift and accurate logistical timing, complete control of customized requests, and total customer support.

Discmatic 55 Mall Drive Commack, NY 11725 800/422-6707, 631/864-9700 Fax 631/864- 9710 <http://www.discmatic.com>

Discmatic offers a comprehensive line of DVD-R and CD-R duplicators that serve a wide variety of applications, including audio and video DVD-R/CD-R duplication, software development, presentation distribution, and data archiving. The Discmatic line includes fully automatic autoloaders and a choice of tower models to meet a range of needs and budgets. These include the DVDiamond 1000, the industry's first 50-disc automatic DVD-R duplicator; the Onyx, a standalone, 100-disc/four-drive automatic CD-R duplication model; the AD1050, a 50-disc automatic CD-R duplicator; and the 16-drive Tigereye tower and four-drive MDX tower models.

Discovery Systems International, Inc. 137 South Gay Street Knoxville, TN 37901 888/284-5389 865/637-0311 Fax 865/637-0312 <http://www.discoverysystems.com>

Discovery Systems is the developer of CourseBuilder, an integrated authoring program with features designed specifically to meet the needs of computer-based training applications, with personalized interaction and automatic grading and scoring, while incorporating the rich components of multimedia. The program's visual development environment lets you create interactive applications without learning any scripting or coding. These applications are self-contained with no need for special players. Applications created on the Macintosh can be converted for playback on Windows OS with no compromise in performance. DSI's consulting division specializes in designing computer-based training, games, and presentations to meet specific needs.

Discreet 10 rue duke Montreal Quebec H3C 2L7, Canada 514/393-1616 Fax 514/393-0110 <http://www.discreet.com>

Discreet provides solutions for creating, managing, and distributing **digital** content, so artists can create once, and use anywhere. Discreet develops systems and software for visual effects, 3D animation, editing, and broadcasting. Discreet's tools are used to create **digital** moving pictures for video, HDTV, feature films, broadcast graphics, interactive games, and the Web. Discreet systems are also popular with designers and architects for 3D visualization and conceptualization. Discreet, a division of Autodesk, was established in 1999. Autodesk is the world's leading supplier of PC and Web design software and **digital** content creation tools.

Diskcopy, Inc. PO Box 8197, 39 Shelley Road Haverhill, MA 01835 888/347-5267, 978/521-5400 Fax 978/521-5300 <http://www.diskcopy.com>

Diskcopy is your one source for CD-Recordables and CD-ROM

manufacturing services. We can turn up to 1,000 CD-R discs in one day, or if you are looking for 100 CD-ROMs, we can do that too! With our unique relationship with Sony Disc Manufacturing, Diskcopy offers you exceptional value and service whether you need 100 or thousands of CD-ROMs. Ask our account manager about our packaging and printing solutions for your next project, and we can ship directly to your customer, worldwide.

Disk-O-Tape, Inc. 23775 Mercantile Road Cleveland, OH 44122-5990
800/932-8273, 216/765-8273 Fax 216/765-0436 <http://www.disk-o-tape.com>

Disk-O-Tape, Inc. is a computer products company focusing on data storage media and software duplication. We offer a full line of data storage media products, including CD-R, CD-RW, DVD-R, DVD-RAM, DLT, 4mm and 8mm tape, optical discs, Zip and Jaz disks, and more, from major manufacturers, such as BASF, Exabyte, Fuji, HP, IBM, Imation, Kodak, Maxell, Mitsui, Panasonic, Pioneer, Quantum, Samsung, Sony, TDK, Taiyo Yuden, and Verbatim. We offer software duplication services for diskette, CD-R, and CD-ROM. We take a "total quality approach" to software duplication, offering quick turns, excellent pricing, superb service, and exceptional product quality.

DisksDirect.com 2165 S. Bascom Avenue Campbell, CA 95008
800/557-1000, 408/626-1717 Fax 408/626-1727 <http://www.disksdirect.com>

DisksDirect.com is a mail order, Internet-based company located in the heart of the Silicon Valley. We specialize in all types of blank media, including DVD-R, CD-R, DLT, Optical, Zip, Jaz, 4mm and 8mm DAT, 1/4-inch tape, and floppies. We also supply the drives which consume the media. Other services include CD/DVD replication and duplication, screen printing, and CD/DVD authoring. For questions, please call our toll-free number or visit our Web site!

Dolby Laboratories Inc Interface Business Park Wootton Bassett
Wiltshire SN4 8QJ UK +44 1793 842100 Fax +44 1793 842101
<http://www.dolby.com>

Dolby Laboratories develops audio signal processing systems and manufactures professional equipment to implement these technologies in the motion picture, broadcasting, and music recording industries. Dolby also licenses these technologies for use in the consumer electronics industry. Providing the best possible audio for any entertainment environment, including music, movies, television, and multimedia is Dolby's primary commitment. Dolby provides encoding tools for making Dolby

Digital bitstreams for DVD-Video applications.

DTS 5171 Clareton Drive Agoura Hills, CA 91301 8181706-3525; Fax 8181706-1868 <http://www.dtsonline.com>

DTS is a **digital** technology company specializing in multichannel audio. Founded in 1993, DTS has become the leading provider of premium, discrete, surround sound for motion pictures. DTS is featured on approximately 20,000 screens worldwide. DTS decoding technology is licensed to manufacturers of consumer electronics equipment for home theater, broadcast, computers, and automobiles. All major manufacturers support DTS and feature DTS decoding in their product lines. DTS Professional Audio equipment is available to encode film soundtracks and music for DVD and CD and for games on DVD-ROM. The CAE-4 Encoder, CAD-4 Professional Decoder, and the E-175DVD Timecode Controller are available through authorized dealers.

Duplium Corporation 2029 Westgate Drive, Suite 120 Carrollton, TX 75006 800/928-2018, 972/512-0014 Fax 972/512-0015 <http://www.duplium.com>

Duplium Corporation is a leading provider of optical media replication and global fulfillment services. Customers from both creative and corporate industries rely on Duplium to provide complete turnkey production solutions for CD-ROM, CD-R, DVD, and diskette. From precision glass mastering and creative package design to barcode tracking and distribution, Duplium will provide you with a customized production plan that captures your project's highest vision, and its smallest details.

DuPont 974 Centre Road Wilmington, DE 19805 800/44-TYVEK,
302/999-5496 Fax 302/999-2988 <http://www.tyvek.com>

Tyvek for disc packaging is a high-performance protective material that provides strength, yet has a non-abrasive surface to prevent scratching. Tyvek is pH neutral, features a lint-free surface, and provides dust and anti-static protection. It is lightweight, rip-resistant, and also resists water, chemicals, and stains. Tyvek does not increase BLER (block error rate) under extreme use, storage, or shipping. It is compatible with automatic sleeve inserters and will not shatter upon impact.

DVD\Works 1266 Soldiers Field Road Boston, MA 02135-1003
617/782-5884, 617/782-5884 Fax 617/782-5925 <http://www.dvdworks.com>

DVD\Works offers complete DVD authoring and mastering services. We can encode from any video source and make title pages and chapter links. We also duplicate your master in any quantity that you desire. We offer capacities of up to DVD-10. Please call us for a custom quote for your DVD project.

E-Book Systems, Inc. 1500 Wyatt Drive, Suite 15 Santa Clara, CA 95054 408/919-6675; Fax 408/919-6677 <http://www.flipalbum.com>

E-Book Systems was founded in 1998 with a mission to bring the natural look and feel of the paper-based book into the domain of **digital** albums. E-Book products makes use of our proprietary patented **Digital** Flip technology to deliver multimedia content. E-Book Systems is paving the way for **digital** imaging revolution. FlipAlbum is the only photo album software out there with 3D page-flipping interface. With our latest product, FlipAlbum CD Maker, users can organize and distribute their much loved FlipAlbums onto CDs for distribution. A Business Edition is also available for commercial distribution.

eHelp Corporation 7777 Fay Avenue, Suite 112 La Jolla, CA 92037
800/677-4946, 858/551-2485 Fax 858/551-2486 <http://www.ehelp.com>

eHelp Corporation, formerly Blue Sky Software, was established in 1990 and is a privately-held corporation headquartered in California. eHelp Corporation's family of products includes the industry standard RoboHELP Office (which features exclusive WebHelp and JavaHelp technology), RoboHELP for Microsoft HTML Help, RoboHELP for WinHelp, and the new DynaHelp. eHelp Corporation's software products improve customer satisfaction, decrease support costs, and increase sales and profitability for organizations worldwide. For a decade, the world's most successful organizations, including IBM, Oracle, Disney, and many more, have relied on eHelp Corporation for their application Help, user assistance, and electronic documentation needs.

Electrograph Systems, Inc. 175 Commerce Drive Hauppauge, NY 11788
800/776-5768, 631/436-5050 Fax 631/436-5227 <http://www.electrograph.com>

Founded in 1982, Electrograph Systems, Inc. is a national distributor of display technology solutions, and the largest wholesale distributor of plasma displays in the United States. Electrograph offers a full range of display technology solutions for dealers and system integrators throughout the U.S. and Europe. Products include LCD flat-panel, CRT, and plasma display monitors, portable and fixed installation projectors, touch-screen monitors, and custom monitor integration solutions. Electrograph also manufactures a complete line of LCD flat-panel and plasma display monitors.

Electrosonic 10320 Bren Road East Minnetonka, MN 55343 952/931-7500; Fax 952/938-9311 <http://www.electrosonic.com>

Electrosonic has grown to be a worldwide supplier of products for the audiovisual, video display, architectural lighting, and presentation room markets, and is now distributing products in over 50 countries. We combine first-rate display expertise with our broad line of products and selected technologies to produce the best possible system for you--a system that delivers the highest level of effectiveness, efficiency, dependability, and economy. As experienced systems integrators working with video, sound, control, or a combination of systems, our clear mission is to support creative clients and their teams with engineered solutions.

ElectroWeb.Com (JMK Interactive, Inc.) 6073 Northwest 167th Street, Unit C4 Hialeah, FL 33015 305/825-5282; Fax 305/825-9460

<http://www.electroweb.com>

ElectroWeb.Com is a "one-stop" shop for high-end consumer electronics, computer peripherals, and blank media. We specialize in DVD-R and CD-R recorders & duplicators, CD printers, media, and plasma display monitors. We ship worldwide and cater to consumer, educational, government, and large corporations. Visit us in Miami, Florida or on the Web. ElectroWeb has been in ecommerce since 1995!

Enor Corporation 245 Livingston Street Northvale, NJ 07547
800/977-6427; Fax 201/750-1680 <http://www.enor.com>

Enor Corporation manufactures heat-sealed vinyl and archival polypropylene storage packages for CDs, CD-ROMs, and DVDs. Among the polypropylene products in stock for immediate delivery are adhesive-back disc security pockets and binder storage pages. Pro-Dots adhesive-back foam hub posts provide an inexpensive means to mount CDs in books or packages. Enor also produces custom heat-sealed products for the multimedia and hobby industries.

Essential Data, Inc. 9222 Marysville Road Oregon House, CA 95952
800/795-4755, 530/692-2459 Fax 530/692-1221 <http://www.essential-data.com>

Essential Data was incorporated in California in 1992. The company specializes in custom CD duplicators for businesses and professionals. Duplicators are available in both standalone and PC-attached SCSI bus models, with or without autoloaders. The duplicators use CD-R burners from Plextor, Panasonic, TEAC, and Yamaha. The company offers a 12-month warranty.

Eurologic Systems 1300 Massachusetts Avenue Boxborough, MA 01719
978/266-9224; Fax 978/266-9228 <http://www.eurologic.com>

Founded in 1988, Eurologic Systems is a leading worldwide provider of network storage technology marketed through OEM and indirect channels. The provider of choice for many of the world's leading server manufacturers and vertical market solutions providers, Eurologic provides a first-to-market advantage by bringing to market innovative network storage systems incorporating leading-edge technologies.

Europadisk, LLC 24-02 Queens Plaza South Long Island City, NY 11101
800/455-8555, 718/407-7300 Fax 718/351- 7961 <http://www.europadisk.com>

Since 1977, Europadisk has been a full-service manufacturer. We produce all formats under one roof to assure you the best price, quality, and delivery. With a factory for compact discs, 12-inch and 7-inch vinyl records, cassettes, on-demand printing services, and a nationally known audio mastering studio, Europadisk is the United States' most complete facility!

Eva-Tone, Inc. 4801 Ulmerton Road Clearwater FL 33762 800/382-8663,
727/572-7000 Fax 727/572-6214 <http://www.eva-tone.com>

Eva-Tone offers full turnkey optical media manufacturing services under one roof, including mastering, glass mastering, CD-Audio, CD-ROM, CD-R, and all other optical media. Eva-Tone also offers a fully **digital** pre-press, multicolor printed components, traditional and custom-designed packaging, multimedia authoring, mailing services, and fulfillment. Eva-Tone celebrated its 75th anand is poised to serve its customers with customized solutions, current technologies, and strict attention to detail into the next millennium.

Future Media Productions 24811 Avenue Rockefeller Valencia, CA 91355
661/294-5575; Fax 661/294-5583 <http://www.fmpi.com>

Future Media Productions is a world-class replicator offering a full range of CD and DVD replication and packaging services. The company is an excellent choice when you need reliability, high capacity, and fast turn-around. As the largest independent replicator in the western U.S., Future Media has the capacity and experience to ensure that your CD and DVD orders are produced on time and within budget.

GEAR Software, Inc. 1061 East Indiantown Road Jupiter, FL 33477
561/575-3200 Fax 561/575-3026 <http://www.gearsoftware.com>

GEAR Software develops DVD and CD recording software applications that support W9x/NT/2000, Mac, UNIX, and Linux platforms. GEAR also

licenses its GEAR.wrks Toolkit (SDK) to other applications developers for integrating CD and DVD recording functionality into authoring, database, consumer audio, imaging, and other software products.

Good Vibrations-RJR **Digital** 4050 Troon Way Bonita, CA
91902 800/828-6537, 619/267-0307 Fax 519/267-1339 <http://www.gvrjr.com>

In business since 1976, Good Vibrations provides retail ready CD product for its clients, including expert graphic design, film separation and printing, CD duplication and replication, CD business cards and packaging performed with very quick turn time. Our clients appreciate GV-RJR's customer service and attention to detail.

GRA, Inc. 465 West Commercial Street East Rochester, NY 14445
800/333-1428, 716/385-2060 Fax 716/1385-6506 <http://www.grainc.com>

GRA, Inc. has been in business serving the software manufacturing industry since 1983. Our services include CD-R and CD-ROM (including business card and mini-round), DVD-R, DVD-ROM, and floppy diskette duplication; CD-R and DVD-R equipment sales; CD-R (including business card and mini-round) and DVD-R silk screening; and packaging, assembly, and fulfillment services. GRA, Inc. is a Rochester, NY "Top 100" company, 1999, 2000.

Graphics International Group 110 Travail Road Markham, Ontario L3S 3J1, Canada 905/471-7780; Fax 905/471-7784 <http://www.graphics-ig.com>

Graphics International Group is a supplier of multicolor screen and offset printing machinery for the decoration of CDs and DVDs in 1,3, or 5 colors. Products include the OMSO Novadisc combination screen/offset printer and the GIG series of screen-only printers. Screen stretchers, washout booths, drying cabinets, and vacuum frames are also available.

Green Solutions 13798 N.W. 4th Street #309 Ft. Lauderdale, FL 33322
888/846-8555, 954/846-8555 Fax 954/846-9156 <http://www.greensolutions.com>

Green Solutions is dedicated to providing our customers with the highest-grade multimedia products on time, and at the lowest prices available anywhere. We coordinate every level of the manufacturing process for our customers, from art and design through printing and product manufacturing/packaging. Formats include video, Audio CD, CD-ROM, DVD, and audio cassette. Manufacturing is handled through several facilities throughout the U.S. and Asia, including New York, Georgia, Florida, Texas, Minnesota, California, and Taiwan.

R. Lee Heath 2555 Victor Avenue, Suite 602 Glenview, IL 60025
847/729-7522; Fax 847/729-9719 <http://www.activatordesk.com>

ActivatorDesk makes possible the wide distribution of custom graphical "skinned" desktops with content allowing for safe Internet PC sales, advertising, education, catalog, and/or image marketing with custom on-board **links**, **content**, or multimedia presentations.

HEURIS 555 Washington Avenue Saint Louis, MO 63101 800/923-9232,
314/534-1514 Fax 314/534-4351 <http://www.heuris.com>

HEURIS' MPEG Power Professional is the most widely-used professional software MPEG encoder. Professional video editors and producers use this award-winning software package to encode video, animation, sound, special effects, and graphics clips to MPEG. MPEG Power Professional runs on Apple and Windows 95/98/NT platforms, and encodes Avid OMFI, Media 100, AVI, as well as QuickTime files directly to high-quality MPEG streams for Internet, CD-ROM, VideoCD, DVD, and other multimedia applications. MPEG Power Professional is the leader in reliable and high-quality encoding for professional DVD authoring systems. HEURIS, providing you the best path from NLE to DVD.

Hewlett-Packard 815 14th Street S.W. Loveland, CO 80537 970/679-5933
<http://www.hp.com/storage>

Hewlett-Packard is a leading supplier of storage solutions, designing and delivering storage innovation for over 30 years. HP offers a complete portfolio of award-winning data management, data protection, and networked storage solutions for the enterprise, mid-range, and desktop environments. Hewlett-Packard Company--a leading global provider of computing and imaging solutions and service--is focused on making

technology and its benefits accessible to individuals and businesses through simple appliances, useful e-services, and an Internet infrastructure that's always on.

HOEI SANGYO CO., LTD 12-15, Nihonbashi-kobunacho, Chuo-ku Tokyo 103-0024 Japan +81 3 3665 3418 Fax +81 3 5642 7559 <http://www.hoei.co.jp>

HOEI SANGYO Co., Ltd. is one of the leading distributors in Japan for equipment and supplies for visual images and **digital**; data processing. HOEI SANGYO develops, designs, and distributes proprietary CD/DVD-R duplicators.

Icon Informations-Systeme GmbH Ziegelofengasse 41/12 Wien W A-1052 Austria +43 1 545 5155 Fax +43 1 545 5155 9 <http://www.xmlspy.com>

Icon was established in 1992 to deliver outstanding software products and technical services in the area of information-systems development. Our software product focus is on cutting-edge XML development tools for the Windows platform, targeting the needs of large-scale customers.

IDT MicroSynergy 17173-A Gillette Avenue Irvine, CA 92614 949/477-1700 Fax 949/477-1717 <http://www.burncd.com>

IDT MicroSynergy produces a full line of CD/DVD editing, authoring, and duplication systems. We are the first company in the world to manufacture robotic and manual solutions that incorporate up to 32 drives in a single enclosure capable of copying up to 3,072 CDs every eight hours (model MS32-12). Our turnkey solutions are designed with the highest-quality components and shipped with a one-year on-site warranty. In 1999, we introduced the first fully removable component enclosure (RCE) for easy swapping of drives. Our combination of quality, professional software, and features has made us the professional's choice.

ILM Corporation 216 Industrial Court Fredericksburg VA 22408 540/898-1406; Fax 540/898-3762 <http://www.ilmcorp.com>

ILM Corporation offers CD-ROM, Internet, and intranet electronic publishing services. ILM, an authorized Adobe Service Provider and member of the Adobe Developers Association, has been providing customized client solutions since 1976. ILM provides data conversion services, transforming hard-copy documents and electronic files into PDF, SGML, or XML formats for CD and Web publications. ILM creates high-quality e-publications and databases that are searchable, linked, and indexed.

ILY Enterprise Inc. 11861 E. Telegraph Road Santa Fe Springs, CA 90670 888/742-5459, 562/801-2888 Fax 562/801-2899 <http://www.ily.com>

ILY Enterprise, Inc. offers efficient, reliable, and user-friendly standalone CD duplicators. Our CD-168 and CD-99A can support up to four targets using 8X, 12X, and 16X. The CD-168 has the multiple master data selection feature that can store up to eleven CDs and a track selection function that allows users to easily edit music tracks. The unit offers an optional external Audio-Input feature, which enables input of MD and tape audio source. CD-99A is a palm-sized external controller with an LED display. It is fully compatible with different CD formats and detects them automatically. With strong technical support, ILY Enterprise is the customer's best choice for CD duplication.

The Imaging Source 1201 Greenwood Cliff, Suite 400 Charlotte, NC 28204 877/462-4772, 704/370-0110 Fax 704/370-0906 <http://www.theimagingsource.com>

The Imaging Source is a joint venture between DBS GmbH of Germany, market-leading providers of **digital**; imaging components, and LEAD Technologies, Inc., developer of award-winning imaging development toolkits. The Imaging Source supplies a wide range of imaging hardware and software, including lighting from Advanced Illumination; optics from Pentax, Computar, and Rodenstock; cameras from Sony, Panasonic, Pixera, and Hitachi; and frame grabbers from DBS, MRT, and Matrox. The Imaging Source is your source for imaging solutions!

IMT 53 rue Casimir Perier Bezons 95871 France +34 34 37 77; Fax +34 34 37 70 <http://www.francexport.com/> imedia-technologies <http://www.imt-sa>

IMT is a manufacturer of material and software specialized in

duplication solutions and the processing of magnetic and optical media and offers manual and automatic printers for direct printing on CD. IMT is at the forefront of CD printing and has been designing these products and selling them worldwide since 1995. IMT provides towers and CD-R autoloaders, standalone or connected, in a single-station or network environment. It offers the CDC 100 Cell Wrapper, designed for quickly and properly wrapping CD boxes, as well as a range of consumables to, protect your CD-R discs, including varnish and jewel cases. The quality of products designed by IMT has granted us a worldwide reputation and a presence in more than 45 countries.

Indigo Rose Corporation 123 Bannatyne Avenue, Suite 410 Winnipeg, Manitoba R3B 0R3, Canada 204/946-0263 Fax 204/942-3421
<http://www.indigorose.com>

Indigo Rose Corporation is a developer of software installation, deployment, and CD-ROM autorun/autoplay tools. Indigo's products include Setup Factory and AutoPlay Menu Studio. Our products facilitate software distribution over the Internet, via disk, or on CD-ROM

Information Packaging Corporation 1670 N. Wayneport Road Macedon, NY 14502 800/776-7633, 315/986-5793 Fax 315/986-4585 <http://www.infopkg.com>

Founded in 1985, Information Packaging Corporation manufactures and markets sleeve and envelope-style packaging for CDs and other media. Our products are made from a variety of materials, such as Tyvek, paper, paperboard, polyethylene, HDPE, polypropylene, and vinyl. Our packages are used in an expanding variety of applications, including those requiring bind-in and multiple-CD capabilities. We encourage our customers to contact us with all their customization needs. Our services include package design and printing. Our success over the years has been achieved through providing quality products to our marketplace and by consistently attempting to advance the standards of customer service.

InfoValue Computing Inc 4 Westchester Plaza Elmsford, NY 10523 914/345-5980; Fax 914/345-5996 <http://www.infovalue.com>

Founded by management and technical members of the IBM Thomas Watson Research Center in 1994, InfoValue Computing, Inc. is known for advancing video access technology and setting the pace in video performance. With open architecture and the ability to deliver high-speed, high-quality video streams to the desktop at affordable price points, InfoValue's Quick Video Suite has marked a new era in video-enabling technology. For the first time, organizations have a complete solution that integrates all major video streaming applications: video-on-demand, multicasting, Internet/intraweb management, and video archiving. Designed with a cost-effective, modular approach, QuickVideo Suite grows as an organization's needs expand.

InnovaCom, Inc. 3400 Garrett Drive Santa Clara, CA 95054 888/464-6734, 408/727-2447 Fax 408/727-6625 <http://www.transpeg.com>
<http://www.dvdimpact.com>

InnovaCom develops and manufactures high-quality, MPEG-based, video communications solutions. The company's product family includes TransPEG(R) video transmission systems and the DVDImpact DV 6000 MPEG WorkStation. InnovaCom's products include the TransPEG Distance Learning Terminal (TDLT), which provides high-quality MPEG video transmission for distance learning and videoconferencing. InnovaComm's TransPEG Network Express Terminal (TNET), a compact, MPEG transmission terminals with new encoders, decoders, and software for composite, component, or SDI video in ATM, Ethernet, and T1/E1. The TransPEG SPS Play-out Server provides hours of managed, continuous MPEG video playout. InnovaComm's DVDImpact DV 6000 MPEG WorkStation is a complete encoding, editing, and DVD authoring system.

InstallShield Software Corporation 900 National Parkway, Suite 125 Schaumburg, IL 60173-5108 800/374-4353, 847/240-9111 Fax 847/619-0788
<http://www.installshield.com>

InstallShield Software Corporation is the acknowledged leader in innovative software distribution and installation deployment solutions. InstallShield provides a full spectrum of products and services that enable

the distribution, management, and consumption of software, and **digital** content via the Internet and throughout the enterprise. Founded in 1987, the privately-held, global company is a recognized authority in software deployment technologies receiving over 50 industry awards for its products. Ranked by Media Metrix, Inc. as the sixth-most-frequently owned software solution for PCs, InstallShield technology powers deployment for 94 of the top 100 independent software vendors.

INTEC America, Inc. 1010 El Camino Real, Suite 370 Menlo Park, CA 94025 650/327-9402; Fax 650/328-4183 <http://www.inteca.com>

INTEC America, Inc., a Japanese company established in 1964, is the developer of the Video-CD Writing Tool. Utilizing its engineering expertise in software development, engineers from the Video-CD writing tool development team created the WindowsNT-based DVD authoring tool, DVDAuthorQUICK. DVDAuthorQUICK debuted version 2.03, released in February 2000, includes support for DVD-Video, DVD-ROM title creation, PAL and NTSC, multi-angle, multilanguage, and multisubtitle features. Version 2.03 also provides a simulation feature for menu and button navigation testing before multiplexing. (Production level 2.04 released July 2000.) Intec America, Inc. is a subsidiary of Intec, Inc. and promotes DVDAuthorQUICK worldwide.

Integral Vision 38700 Grand River Avenue Farmington Hills, MI 48335 248/471-2660 Fax 248/615-2971 <http://www.iv-usa.com>

Integral Vision is a provider of machine vision application development software and vision systems for factory automation. Integral Vision has been serving the needs of the optical disc industry for over 12 years. We offer systems designed for all stages of the production process, including replication, printing, and packaging. Our systems automatically gauge, identify, and inspect at speeds and accuracy not achievable by human means. Applications range from identifying imperfections that might escape detection during manufacturing to providing online measurements, so out-of-tolerance parts are never produced.

InterActual Technologies, Inc. 100 Century Center Court, Suite 200 San Jose, CA 95112 408/435-6700 <http://www.interactual.com>

InterActual Technologies, Inc. is the leading provider of software and services that connect DVD and the Internet. PCFriendly and the new InterActual Player 2.0 software have enabled millions of viewers to enjoy special DVD features and DVD/Web synchronization when using Internet-connected DVD players or personal computers. Applications for InterActual software and services include Hollywood movies, music, training videos, product catalogs, product demonstration discs, advertising, and more.

Interra **Digital** Video Technologies, Inc. 2001 Gateway Place, Suite 440W San Jose, CA 95110 800/646-4434, 408/573-1400 Fax 408/573-1430 <http://www.interra-video.com>

Interra **Digital** Video Technologies, Inc., is a leading provider of testing, verification, and quality analysis software for professional **digital** video organizations. With a focus on the MPEG and DVD standards, Interra DVT has built a strong client list and industry reputation with its product line offerings: MProbe, the offline MPEG bitstream analyzer, and Surveyor, a DVD-Video content analysis tool for DVD producers. Its latest product, SyncCheck, provides lip sync analysis. In addition to providing end-user applications, Interra DVT licenses its technology to product and systems developers in the **digital** television industry. Based in San Jose, California, Interra DVT was formed in 1997 and incorporated in 1999.

IPC Communications Services, Inc. 20081 Ellipse Foothill Ranch, CA 92610 888/563-3320, 949/588-7765 Fax 949/829-0690 <http://www.ipc-world.com>

IPC Communications Services, Inc. is a leading optical mastering and media manufacturer with full supply chain management and ebusiness capabilities. IPC specializes in CD mastering; CD and DVD replication, print, bind, assembly, and fulfillment; and ebusiness solutions--all in-house. In business since 1949, IPC is a wholly-owned subsidiary of

Journal Communications, Inc., the oldest employee-owned company in the U.S. employing over 7,000 people worldwide. IPC has facilities and operations in the U.S., France, and Ireland, with a strategic alliance in Singapore and Mexico. IPC is ISO 9002 Registered since 1997 and a Microsoft Authorized Replicator since 1993.

iQROM Solutions 7635 Ashley Park Court Orlando, FL 32835
877/494-7766, 407/299-2230 Fax 407/299-8396 <http://www.igrom.com>

iQROM Solutions specializes in the replication of business and trading card-sized CD, CD-R, and DVD discs. As a one-stop shop, iQROM can also provide content creation for CD-ROM and DVD. Only iQROM offers CD-U technology, software on a CD that allows clients to virtually update CD content after it has been distributed.

ISODISC 1218 East Hartman Avenue Omaha, NE 68110-2810 888/REPLIC8,
402/453-1699 Fax 402/453-1799 <http://www.isodisc.com>

ISODISC delivers complete CD-R silkscreen printing and replication services. ISODISC provides the full range of optical media services for CD, DVD, and business card CDs, including stamping services and bulk media. It also provides in-house silkscreen printing, quick-turn CD-R printing and replication, media certification and analysis, printed packaging, jewel cases, DVD cases, C-shells, TrimPak, SlimBox, sleeves, and more. ISODISC is a VAR for Rimage/Cedar and MicroBoards, an authorized distributor of Primera, CD Associates, IMT-IMedia, EZQuest, Extreme, and other CD-R production and CD packaging systems. ISODISC is a wholly-owned business unit of SSG.

ISOMEDIA, Inc. 2457 152nd Avenue NE Redmond, WA 98052 800/468-3939,
425/869-5411 Fax 425/869-9437 <http://www.isomedia.com>

ISOMEDIA, Inc. has been a leader and innovator in CD-R and electronic media management since 1991. If you need media and data conversion, CD-R duplication, CD replication, floppy duplication, CD business cards, shaped CD, DVD and DVD-R replication and duplication, or complete packaging and fulfillment, ISOMEDIA gets the job done. Whether it is one CD-R or 1,000,000 CD-ROMs, ISOMEDIA's experienced staff will get your next project or title done right the first time. ISOMEDIA innovative CD-R burning software that allows users to write the same image to multiple CD recorders. This innovation continues today into the DVD area with ISOMEDIA'S forthcoming utilities.

Iterated Systems, Inc. 7 Piedmont Center, Suite 600 Atlanta, GA
30305-1530 800/437-2285, 404/264-8000 Fax 404/264-8300
<http://www.mediabin.com>

An imaging innovator since 1987, Iterated Systems is a dynamic, growing company whose MediaBin image content management software produces brand and product images for ebusiness. The MediaBin platform combines a database with a powerful image-processing engine to automate high-volume image production and tracking for ecommerce or print output. MediaBin's unique Photoshop layering capabilities enable customized Web images to be created as needed. By using MediaBin as the imaging foundation of an ebusiness infrastructure, companies can update product offerings quickly, be more responsive to market demands, and increase the overall customer experience.

Ivy Hill Corporation/ Warner Media Services 375 Hudson Street New
York, NY 10014 212/741-1404 Fax 212/929-5365 <http://www.ivyhill-wms.com>

Ivy Hill has established a global identity as a pre-eminent printing, design, and packaging firm for the video, music, CD-ROM, and DVD industries. The company offers the largest assortment of disc case and set-up box options, and has a number of proprietary packaging solutions. One of these is The Snapper, created specifically for DVD. This award-winning package is available in four-and six-panel configurations and gives art directors the ability to utilize any number of decorative printing techniques, including foil stamping, die-cuts, and embossing.

Jukebox Information Systems 31119 San Benito Street Hayward, CA
94544 510/441-8125 Fax 510/441-2214 <http://www.jbis.com>

Jukebox Information Systems is a manufacturer of high-quality,

low-cost CD duplicator controller boards and systems. The heart of the system is the HPC2000 controller board. This second-generation SCSI array controller is an SBC featuring up to three SCSI channels, IDE, serial, and parallel ports, optional VGA capability, and a PCI expansion slot. The HPC 2000 controller board offers multiple images, user-friendly verification procedures, and 12X support.

JVC **Digital** Storage Systems 1700 Valley Road Wayne, NJ
07470 800/526-5308, 973/315-5000 Fax 973/315-5030 <http://www.jvc.com/ds2>

JVC **Digital** Storage Systems offers a full range of 100, 200, and 600-disc capacity jukeboxes that can be configured with a variety of devices, including CD-ROM, CD-R, CD-RW, DVD-ROM, DVD-RAM drives, and a color disc printer. With fast access exchange times as low as 4.5 seconds, they can be used for robust network storage and archiving applications. JVC achieves superb performance and offers reliable mass storage with innovative features, such as auto-alignment, mail slot, 50-disc magazines, airtight enclosure, and internal air-filtration system to ensure a clean-room operation. JVC also offers bundled solutions.

JVC Disc America Company 9255 W. Sunset Boulevard, Suite 717 Los Angeles, CA 90069 310/274-2221 Fax 310/274-4392 <http://www.jvcdiscusa.com>

JVC Disc America Company is a full turnkey DVD and CD replicator. With state-of-the-art replication and fulfillment facilities on the east and west coasts, JVC manufactures over 12 million discs each month. As an original member of the DVD Forum, JVC has direct technological exposure to the nuances of DVD--and uses it. An ISO 9002-certified replicator, JVC provides customers with the best support in the industry. Customers can also track orders via the Internet, using JVC's unique Web-based system. For more information, contact Sean Smith (Senior Vice President, Sales and Marketing) at 310/274-2221 or visit us online.

JVC Professional Computer Products 5665 Corporate Avenue Cypress, CA 90630 714/816-6500 Fax 714/816-6519 <http://www.jvc.net>

JVC Professional Computer Products manufactures a 100, 200, and 600-disc jukeboxes. The latest release in DVD format allows users four times the capacity of CD-R/RW technology, making these libraries the ideal solution for the ever-growing need for more capacity. The new MC-7000 series consists of three models ranging from 260GB to 1.6TB of data capacity. Model features include 50-disc removable magazines, 1X DVD-RAM drives, a SCSI-2 interface, and supports for up to six drives. JVC's libraries were designed and manufactured to meet the highest quality, flexibility, and performance you'd expect from JVC.

kdg mediatech AG Nr. 91 Elbigenalp Tyrol 6652 Austria +43 5634 500
Fax +43 5634 6105 <http://www.kdg-mt.com>

kdg mediatech manufactures CDs, DVDs, MCs, and VHS cassettes. Headquartered in Austria, kdg mediatech features a large CD/DVD pressing factory and R&D department. In addition to these facilities, kdg has two more pressing factories at Weesp (NL) and St.-Michel-sur-Meurthe (F) as well as sales and distribution outlets in France, Great Britain, Italy, and Hong Kong. With a capacity of 500,000 CDs and 60,000 DVDs daily, kdg offers a range of products, including CD-Audio, CD-ROM, DVD (5, 9, 10), MC, and VHS. Special products include ICON disc, 8-cm disc, CD cards, and the ALCATRAZ copy protection system.

Kenwood Technologies (USA), Inc. 1701 Junction Avenue, Suite 100 San Jose, CA 95112 888/730-4206 408/467-7900 Fax 408/451-1150
<http://www.kenwoodtech.com>

The Kenwood 72X TrueX CD-ROM is made with Zen's TrueX technology and Kenwood's patented seven-beam pickup, which illuminate multiple tracks simultaneously, read them in parallel, and process the data through a custom ASIC. The 72X TrueX CD-ROM drive actually spins the disc slower than conventional single-beam drives, resulting in extremely precise readability and very quiet operation. The 72X TrueX CD-ROM drive provides high-performance data throughput across the entire disc making it ideal for graphic-intensive applications and **other reference content**.

KOM Incorporated 20 Trafalgar Square Suite 450 Nashua, NH 03063
888/5KOMINC, 603/882-5991 Fax 603/882-8708 <http://www.kominc.com>

KOM Incorporated is focused on providing a new sense of freedom and security through developing the largest selection of innovative and sophisticated storage management solutions in the world. KOM has always designed storage solutions with the future in mind. Wherever technology takes us--be it wireless, the Internet, or some other form of emerging technology, KOM will continue to ensure that your enterprise storage management needs are satisfied. KOM products are sold around the world through a network of authorized KOM partners.

Krauss-Maffei Krauss-Maffei-Str. 2 Munich 80997 Germany +49 (0)89 8899 3491 +49 (0)89 8899 2872 Fax +49 (0)89 8899 2947
<http://www.krauss-maffei.de>

Krauss-Maffei has made a name for itself in the injection molding machine business for its superior quality and design. They have taken this knowledge and expanded to the optical disc field, in which they now have been working for over 20 years developing downstream systems. These downstream systems for CD and DVD replication are provided the backbone support they need from Krauss-Maffei's specialized non-open mold along with their own injection-molding machine, the KM 80-190 CD. Whether it is replication equipment for CD, OBC, CD-R, DVD-5, 9, and 10, or for the various DVD recordable formats, Krauss-Maffei is your single source for downstream and injection molding.

KYSO 3088 Wetmore Drive San Jose, CA 95148 877/270-5933,
408/270-5933 Fax 408/223-0597 <http://www.kyso.com>

KYSO, a manufacturer of pressure-sensitive materials, concentrates on the CD industry's labeling needs. Our specialty is the high quality Ink Jet Gloss labels for 120mm, 80mm, and business card CDs. Label applicators and labels for business card CDs are distributed through KYSO. KYSO does not sell directly to end-users. Distributor inquiries are welcome.

K-PAR Systems, Inc. 5 Princeton Way, Suite 300 Princeton, NJ 08540
888/379-9955, 617/713-4503 Fax 617/232-8235 <http://www.k-par.com>

K-PAR Systems, Inc. is an international software company specializing in archival management since 1991. Archimedia is a complete archival management software solution. Archimedia manages hard disk/ RAID systems as a caching and staging area for data writing to and retrieving from jukeboxes, drives, and towers under NT or Solaris operating systems. Supported media types include MO/WORM, CD/CD-R, and DVD-ROM/RAM/R. Archimedia features global caching and hierarchical storage management (HSM) and supports industry standards like NTFS, UFS, ISO 9660, and UDF. Offline media management is included. An API and SDK are available by request for OEMs and integrators with special custom requirements.

LABELdotCOM 3088 Wetmore Drive San Jose, CA 95148 408/531-1440; Fax 408/531-0442 <http://www.label.com>

Since 1996, LABELdotCOM has been major reseller of CD label application kits, labels, jewel case inserts, CShells and the latest in inkjet label performance, KYSOpro and KYSO IJ Gloss labels. We are now featuring KYSO IJ Gloss business card CD (Biz Card) labels, and a new multipurpose label applicator for 6150, 6350, and minidisks. We feature the CD Stomper kit and labels along with our own KYSOpro labels and template software. A4 sheets of labels and jewel case inserts are available. LABELdotCOM offers same day shipping both domestic international, as well as low international shipping rates.

LaCie Ltd. 22985 NW Evergreen Parkway Hillsboro, OR 97124
503/844-4500; Fax 503/844-4508 <http://www.lacie.com>

LaCie specializes in the development, manufacture, and distribution of cross-platform, high-end mass storage, **digital** video, and color management computer peripherals. Products include Windows and Mac CD-RW drives, towers and duplicators; portable and removable hard drives and DVD-RAM drives, tape backup drives, 19" and 22" monitors, and monitor hardware calibrators.

Laser Optic Group U.S.A. 1445 Huntington Drive #250 South Pasade, CA

91030 888/564-2371, 626/799-9018 Fax 626/799-6035 <http://www.cdrlog.com>

Laser Optic Group U.S.A. is a wholesale distributor of CD-R and CD-RW media. We carry unbranded and LOG-branded CD-R discs (exclusive distribution and made in U.S.). Our products include, but are not limited to, the following: silver/blue, silver/gold, gold/gold, white printable, silver printable, CD-DA, 80-minute discs, business card size, CD-RW, and pre-formatted CD-RW. All products are covered by our 100% manufacturer warranty.

Law Cypress Company 5883 Eden Park Place San Jose, CA 95138
800/0344-3044, 408/363-6612 Fax 408/363-8020 <http://www.lawcypress.com>

Law Cypress is the largest document management solutions provider in the industry, offering resellers a comprehensive product set, a full suite of technical services, and true single-source contract maintenance.

LEDA Distribution Corp./ POSTECH Corp. 10811 Shoemaker Avenue Santa Fe Springs, CA 90670 562/941-5332; Fax 562/941-0409
<http://www.leda-dist.com>

LEDA/POSTECH manufactures high-quality CD-R and CD-RW media products. Product line includes MINICD-R, business card CD-R, Diamondback (true silver/silver) CD-R, five different color CD-R media, printable CD-R. Formats include 5, 22, 74, 80, and 99-minute discs. Distribution and sales offices in the U.S., Mexico, Taiwan, Colombia, Brazil, and Argentina. Call for the regional office near you.

LEVEL4 MEDIA 17 Raven Road San Anselmo, CA 94960 415/459-6949; Fax 415/459-6961 <http://www.level4media.com>

LEVEL4 MEDIA specializes in DVD-Video title and tool development. Our projects include the DVDesigner authoring tool and the DVD-V7200 Demo Disc for Pioneer. LEVEL4 MEDIA has 20 years of experience making interactive video.

LG Electronics 1000 Sylvan Avenue Englewood Cliffs, NJ 07632
201/816-2000; Fax 201/816-0636 <http://www.lgeus.com>

LG Electronics U.S.A., Inc. is a wholly-owned subsidiary of Korea's LG Electronics Inc., reporting over \$7 billion in worldwide sales and a leading developer in multimedia, display, and LCD technologies. A company focused on product technology leadership and customer satisfaction, LG Electronics U.S.A. offers an advanced line of computer monitors, CD-ROM, CD-RW, DVD drives, microwave ovens, and room air conditioners. LG Electronics U.S.A., Inc. is a division of LG, an \$83 billion conglomerate with a wide range of businesses that include electronics, telecommunications, petrochemicals, energy, trading, finance, and a variety of other products and services.

Ligos Technology 1475 Folsom Street, Suite 200 San Francisco, CA 94103 888/464-8765, 415/437-6137 Fax 415/437-6139 <http://www.ligos.com>

Ligos Technology is the leading worldwide provider of real-time software-only MPEG encoding and decoding technology. LSX-MPEG is a family of products developed from our patent-pending LightSpeed motion estimation technology. The cornerstone product is LSX-MPEG Encoder, an AVI to MPEG-1 and MPEG-2 transcoder for the Windows platform. LSX-MPEG Player is a DirectShow filter for MPEG-2 playback through the Windows Media Player. GoMotion is seamless, scalable MPEG-2 compression software that delivers high-quality video at lower data rates than even dedicated MPEG-2 chips can--all on Pentium computers and with no added compression hardware. Indiana Avenue, Suite 130 Riverside, CA 92506 888/LUMINEX, 909/781-4100 Fax 909/781-4105 <http://www.luminex.com>

Luminex is an industry leader in developing and marketing removable media storage solutions. Luminex develops server-based archiving, networking, and data distribution solutions focused on CD, DVD, and future random-access removable media technologies. Luminex is committed to standards-based storage technology to create long-term value for our customers and partners.

Macrovision Corporation 1341 Orleans Drive Sunnyvale, CA 94089
408/743-4600 Fax 408/743-8610 <http://www.macrovision.com>

Macrovision Corporation develops and markets content copy protection

and **rights** management technologies and products to prevent the unauthorized duplication, reception, or use of video and audio programs and computer software. The company provides its products and services primarily to the home video, pay-per-view, cable, satellite, video security, consumer multimedia, and application software markets.

MailSafe 4340 West 47th Street Chicago, IL 60632 800/848-6552; Fax 800/521-3489 <http://www.mail-safe-mailers.com>

MailSafe is a full-service manufacturer of rigid paperboard mailers of all shapes, styles, and sizes. MailSafe provides custom and plain packaging for diskettes, CDs, DVDs, software, and videos. With in-house design, full-service printing and manufacturing, MailSafe is the one-stop shop for rigid and electronic media mailers.

Mainline Media 41 East 400 North #331 Logan, UT 84321 435/757-9639 Fax 435/787-8157 <http://www.mainline-media.com>

Get results with Mainline Media! We specialize in high-quality CD-R and business card CD duplication. To ensure your project is done right, Mainline Media only uses state-of-the-art duplication equipment and the highest-quality media. With our innovative packaging and in-house design department, we guarantee that your discs get noticed.

MARCAN, Inc. 1800 112th Avenue NE, Suite 205E Bellevue, WA 98004 425/635-7477; Fax 425/635-7479 <http://www.marcan.com>

MARCAN, Inc. sells a variety of CD and DVD recording and duplication systems in multitrack and autoloading configurations, including CD-R color printing systems. The company also offers high-quality, quick turnaround CD-R and DVD-R duplication, CD replication, and DVD-Video authoring services. MARCAN has been providing CD and DVD solutions for more than six years to such organizations as Boeing, Intel, Microsoft, Oracle, AT&T, NASDAQ, and many others.

Marden Edwards Limited 2 Nimrod Way, Ferndown Industrial Estate Wimborne Dorset BH21 7SH UK +44 1202 861200; Fax +44 1202 861400 <http://www.mardenedwards.com>

Marden Edwards Limited designs, manufactures, and supplies the largest range of envelope end-fold overwrapping systems, with models suitable for high-speed wrapping of individual products and automatic collating systems for multipacks. Marden Edwards' product line features a range of case packers, stretch-wrappers, shrinkwrappers, shrink tunnels, and end-of-line product handling systems. Founded in 1962, over 6500 Marden Edwards systems have been installed worldwide through an established network of trained agents and distributors.

Marin **Digital** 4340 Redwood Highway, Suite F224 San Rafael, CA 94903 800/881-1982, 415/507-0470 Fax 415/507-9968 <http://www.marin-digital.com>

Marin **Digital** is a DVD creation service company ranked in the top six encoding and authoring houses in the United States. Marin has over 350 DVD titles to its credit, including film, music videos, corporate presentations, multimedia museum exhibits, and kiosks. Our goal is to help you realize your DVD projects in the most innovative and cost-effective manner possible. We are experts in all phases of DVD production, from project consultation and project management through encoding, authoring, manufacturing and distribution. We distinguish ourselves by state-of-the-art technical expertise and unsurpassed customer service. CEO Chris Armbrust was a key developer of CD-ROM technology and is one of the true pioneers of DVD.

Matrox Electronic Systems Ltd.--Video Products Group 1055 St. Regis Boulevard Dorval, Quebec H9P 2T4, Canada 800/361-4903, 514/685-2630 Fax 514/685-2853 <http://www.matrox.com/video>

Matrox Video Products Group is a technology and market leader in the field of **digital** video hardware and software for real-time editing, DVD authoring, and Web streaming applications. The award-winning Matrox DigiSuite product line is used by television broadcasters, post-production facilities, and project studios worldwide. The new Matrox RT Series of products is designed for corporate communicators, event

videographers, and video enthusiasts. Founded in 1976, Matrox is a privately-held company headquartered in Montreal, Canada with offices in the United States, the United Kingdom, France, Germany, Italy, and Hong Kong.

Max Optical 1223 Osborne Road Downingtown, PA 19335 888-666-3161
610/518-0556 Fax 781/634-5585 <http://www.maxoptical.com>

Max Optical specializes in the resale of CD duplication hardware, blank CD-R media, preprinted CD-Rs, CD packaging, and CD analysis systems. CD duplication services are available with a daily capacity of 2000 CD-Rs.

Maxell Corporation 22-08 Route 208 Fair Lawn, NJ 07410 800/533-2836,
201/794-5922 Fax 201/796-8790 <http://www.maxell.com>

Maxell Corporation is a manufacturer of magnetic media products, specifically professional audio and video products. Maxell's products include MS Studio, DAT, ADAT and DTRS audio cassettes, D-2, D-3, D-5, DVCPRO, Betacam, Betacam SP, **Digital** Betacam, VHS and 8MM videocassettes, floppy disks, optical discs, DLT, 4MM, 8MM, and CD-R data media products.

Media Dimensions 1825-B Kramer Lane Austin, TX 78758 512/821-2000;
Fax 512/281-2999 <http://www.media-dimensions.com>

Media Dimension, founded in 1990, has five lines of replicating equipment and creates approximately 75,000 CDs and 15,000 DVDs per day. Our clients include IBM, Dell, Microsoft, Compaq, Advanced Micro Devices, Motorola, and many others. Media Dimensions stands apart from our competition with our ability to author films and code products for DVD. Currently, Media Dimensions is working with a handful of film distribution companies in Europe on such conversions and has seen considerable business in the conversion of corporate films and videos to DVD. We also cater to the private sector.

Media Factory Inc. 48873 Kato Road Fremont, CA 94539 510/438-0373
Fax 510/445-0877 <http://www.mediafactoryinc.com>

Media Factory Inc. provides DVD and CD-ROM replication, CD-R printing and duplication, floppy disk duplication, graphic design, custom packaging, product assembly, and kitting.

Media Group, Inc. 44799 Industrial Drive Fremont, CA 95376
510/683-0188 Fax 510/683-0189 <http://www.mediagrupusa.com>

Media Group, Inc. is a worldwide ISO 9002, WAMO-certified replicator of DVD 5, 9, and 10, as well as CDs. We have mastered the art of quality disc printing, while maintaining aggressive pricing. With factories on two continents, we offer worldwide shipping capabilities. We also offer Mini and business card DVDs and CDs. Media Group is a manufacturer, not a broker, so you get factory-direct pricing and direct communication.

Media Stream Tech, Inc. 5F, No.17, Sec. 1, Chinshan S. Road Taipei
100 Taiwan R.O.C +886 2 33 93 10 55, +886 932 300 667 Fax +886 2 23 21 31
21 <http://www.msti.com.tw>

Media Stream Tech, Inc. is a Taiwan-based one-to-one CD duplicator company, focusing on manufacturing and promoting our products for the worldwide market. We are looking for a partner who is interested in promoting our brands, OEM, ODM business, or as an exclusive business agent. Media Stream offers the CopyALL-Terminator; the CopyALL-MixType, which supports IDE and SCSI interface CD-ROM and CD-R drives; the CopyALL-Mobile, which supports drives via a voice system; and our CopyALL-Tower, which supports one-to-one up to one-to-seven duplication, as well as DVD duplication.

MediaFORM 400 Eagleview Boulevard Exton, PA 19341 800/220-1215,
610/458-9200 Fax 610/458-9554 <http://www.mediaform.com>

Established in 1989, MediaFORM is the world's leader in CD-R duplication and printing solutions. Today, MediaFORM develops and manufactures an extensive line of state-of-the-art manual, network-enabled and autoloading CD-ROM duplication production systems. Fortune 500 companies, such as DuPont, General Electric, and Disney, as well as high-level government agencies like NASA, the Pentagon, and U.S. Postal, use MediaFORM because of its industry-leading technology and long-standing

reputation for engineering the finest product line available. MediaFORM is headquartered in Exton, Pennsylvania, with branch offices in Boston, New York, and Los Angeles, and has a worldwide network of quality channel partners.

Mediatechnics Systems Inc. 15863 Greenway-Hayden Loop #115
Scottsdale, AZ 85260 480/778-0701; Fax 480/778-0703
<http://www.mediatechnics.com>

Mediatechnics Systems Inc. has over 40 years of experience. The company manufactures high-output automated CD duplicators. Our CD duplicators have the highest throughput, capacity, and quality of any system in the industry.

MegaHaus 2201 Pine Drive Dickinson, TX 77539 281/534-3919; Fax 281/534-6580 <http://www.megahaus.com>

Since 1987, MegaHaus has been the leading supplier of computer products. Check out our Web site--we're bigger than ever before.

Memtek Products, Inc. (Memorex) 10100 Pioneer Boulevard, Suite 110
Santa Fe Springs, CA 90670 562/906-2800; Fax 562/906-2848
<http://www.memorex.com>

Memorex is an industry-leading manufacturer and marketer of consumer media and computer products. Memorex offers a variety of audio and video products, which includes the following: audio tapes, MiniDiscs, Music CD-Rs, video tapes, computer diskettes, and CD-Rs. In addition to the variety of the consumer media line, Memorex offers a unique computer accessory line, which includes keyboards, mice, label makers, jewel cases, labels, and ROM Drives.

Metropolis DVD 1790 Broadway, 9th Floor New York, NY 10019
212/575-7300; Fax 212/755-9335 <http://www.metropolisdvd.com>

Metropolis DVD is a full-service studio offering DVD creative development and production management; DVD project mastering, including asset preparation consulting, video and audio encoding, DVD authoring, emulation, and DVD reference disc output; a DVD-Video service bureau, with MPEG-2 and MPEG-1 encoding services; and CD-DVD conversion. The studio features the latest in technology, with eight new Sonic Solutions DVD production workgroups; a **digital** video network; and the first fully switched fiber-optic storage area network in the U.S. to be used in DVD production.

Micro Design International, Inc. 37 Skyline Drive, Suite 3104 Lake Mary, FL 32746 800/228-0891, 407/804-0727 Fax 407/804-1315
<http://www.mdi.com>

In the competitive marketplace of data storage, Micro Design International, Inc. offers the best combination of hardware and software solutions available. MDI's storage hardware solutions cover the range of requirements from server-attached storage for enterprise-class applications to the latest in network-attached data storage and optical disc servers for workgroups. MDI also offers a new Companion Series of desktop drives. And, as it has for 20 years, MDI software sets the pace by providing the best in optical storage management for both network administrators and users.

Micro Express 1811 Kaiser Avenue Irvine, CA 92614 949/852-1400; Fax 949/852-1225 <http://www.microexpress.net>

Micro Express is a manufacturer of desktop and notebook PCs that are sold direct and is known for its high quality and competitive pricing. Reviews in many well-known publications consistently rank Micro Express computers among the best on the market from a performance standpoint, and they are also always ranked as one of the best values. Micro Express computers are regularly award-winners, being selected for Editor's Choice or Best Buy by many publications.

MicroBoards Technology, Inc. 1721 Lake Drive West Chanhassen, MN 55317 800/646-8881 952/556-1600 Fax 952/556-1620 <http://www.microboards.com>

MicroBoards Technology, Inc. is an OEM provider of CD-R and DVD systems for audio, video, and data applications. The company specializes in providing VARs and system integrators exclusively with CD-R and DVD systems as well as support for a multitude of end-user requirements. MicroBoards'

account managers are experts in a variety of CD-R and DVD applications and experienced in developing VAR relationships. Product offerings include high-quality CD-R media, CD-R, and DVD recordable systems, duplication and printing solutions, and jukebox and tower configurations. MicroBoards also offers AuthorSuite, a turnkey DVD-Video solution for the Windows NT platform.

MicroNet Technology, Inc. 51 Discovery Irvine, CA 97218
949/453-6000; Fax 949/453-6071 <http://www.micronet.com>

Based in Irvine, California, MicroNet Technology, Inc. is an innovator in the development of a full range of data storage solutions for creative professionals and IS managers with enterprise-wide networks. MicroNet's extensive line of storage solutions include RAIDbank 2000, SANcube FireWire storage area networks, Genesis RAID systems, FibreFlex workgroup solutions, the DataDock family of transportable data storage systems, award-winning disk arrays, hard disk drives, DVD-RAM, CD recording systems, DLT, AIT, and DAT back-up systems. MicroNet products are available through Ingram Micro, Tech Data, resellers, VARs, and distributors worldwide.

Microtech Systems 2 Davis Drive Belmont, CA 94002-3002 800/223-3693
650/596-1900 Fax 650/596-1915 <http://www.microtech.com>

Microtech Systems is a leading developer and manufacturer of high-volume, high-performance media publishing, duplication and conversion systems, and software. The company's products include ImageAutomator and ImageMaker CD-R production systems, and MyDisc, BatchDisc, ImageAligner, and CustomCD applications. Among the company's clients are AT&T, Lucent Technologies, Premiere Radio, SmartForce (formerly CBT Systems), CDNow, Informix, Intel, Kodak, Oracle, IBM, Capitol Records, and Electronic Arts.

MicroVision Development 5541 Fermi Court #120 Carlsbad, CA 92008
800/998-4455, 760/438-7781 Fax 760/438-7406 <http://www.surething.com>

At MicroVision Development, we specialize in software that helps you look your best. Whether it's printed or electronic media, labels, business cards, memos, or Web pages, we help you add expression to your personal and professional communications. Combining just the right mix of ease-of-use and powerful features, our software programs empower everyone to produce results with pride.

Minerva Networks 2111 Tasman Drive Santa Clara, CA 95054
408/557-9400; Fax 408/557-0747 <http://www.minervanetworks.com>

Minerva Networks, Inc. is a leading provider of carrier-class video networking products and services, which enable the convergence of television and the Internet. Our IP television management software, media encoders, media gateways, and media transcoders are the essential components of complete solutions (IP Television Headends) for the delivery of video services over broadband IP networks. Enterprises and broadband network service operators worldwide are using our products to deliver next-generation entertainment, communication, and ecommerce applications. IP Television Headends enable high-quality individualized programming, advanced interactivity, targeted advertisements, and a new breed of video ecommerce.

Minnetonka Audio Software 17113 Minnetonka Boulevard Minnetonka, MN 55345 952/449-6481 Fax 952/449-0318 <http://www.minnetonkaaudio.com>

Minnetonka specializes in 5.1 surround sound authoring tools. Minnetonka products make it easy to mix to 5.1 surround and to encode for CD and DVD.

Mitsui Advanced Media, Inc. 10045 Federal Drive Colorado Springs, CO 80908 800/682-2377, 914/253-0777 Fax 914/253-8623 <http://www.mitsuicdr.com>
<http://www.mitsuicdrstore.com>

Mitsui Advanced Media, Inc. manufactures blank CD-Recordable and DVD-Recordable media. Mitsui has optimized its current, patented Phthalocyanine dye--responsible for our dependable, long-term archivability--and combined it with a new, stronger silver reflective layer. The Mitsui silver CD-R offers the highest reflectivity rate of a CD-R to date, exceeding the Orange Book standard. Mitsui also offers

Diamond Coat for improved thermal printability and high resistance to physical damage. Mitsui provides CD-R media in a variety of premium surfaces for printing via inkjet and thermal transfer, as well as offering professional custom silk-screening services in-house. The Mitsui DVD-R is a highly specialized blank DVD disc for massive data storage and retrieval, suitable for authoring any type of DVD disc (DVD-Video, DVD-ROM, DVD-Audio).

Mobile Automation, Inc. 11111 Santa Monica Boulevard Suite 1220 Los Angeles, CA 90025 800/344-1150; 801/434-4440 Fax 801/434-4441
<http://www.mobileautomation.com>

Mobile Automation, Inc. specializes in providing a comprehensive solution for managing all your corporate PCs, mobile notebooks, and handheld PDA devices from a single easy-to-use console. Our product, Mobile Automation 2000, is a highly enterprise-scalable, powerful, yet easy-to-learn product that provides complete hardware and software inventory asset management, software distribution, centralized task scheduling, application self-healing and imaging, and third-party product integration. Mobile Automation began in 1997 and has remained focused on providing systems management solutions. This focus will carry forward as the marketplace moves more towards the smaller handheld wireless computing devices.

Multi Media Masters & Machinery (4M) Avenue des Sports 42, Yverdon-les-Bains VD 1400 Switzerland +41 24 4237111 +41 24 4237102 Fax +41 24 4237201 <http://www.4M-inc.ch>

Multi Media Masters & Machinery (4M) is a leading manufacturer of systems for the mass production of all CD and DVD formats. The company provides total solutions for data storage media production. In addition to its wide products portfolio, 4M delivers an array of services, such as manufacturing and quality assurance process technology, moulding stampers, and services for all recordable and rewritable CD and DVD formats, as well as project management and plant design. 4M Technologies maintains production facilities in Switzerland and Germany, as well as sales and services subsidiaries in the main markets, such as USA, Taiwan, Hong Kong, and mainland China.

MultiMedia Effects, Inc. 110 Riviera Drive Markham, Ontario L3R 5M1, Canada 800/367-3054, 905/943-7557 Fax 905/943-7667
<http://www.storageheaven.com>

MultiMedia Effects is a leading supplier of mass storage solutions based on disk, tape, optical, CD-R, DVD, RAID, jukeboxes, and libraries. We have over eight years of expertise in building integrated storage solutions to meet your needs for today and the future.

Multimedia Technology Center 194 Ferncliff Road Mohawk, NY 13407 315/866-4639; Fax 315/866-4709 <http://www.mtc2000.com>

Multimedia Technology Center has been enabling multimedia, VideoCD, DVD-ROM, WebDVD, DVD-Video, and SuperVCD developers since 1987. MTC received the ICDA/DVDA Association Gold award for most innovative VideoCD authoring tool set in 1997 and created the world's first WebDVD tool set, DVDMotion, in 1997, which was rated "awesome" by New Media magazine. MTC is the first and only publisher offering a DVD and VCD authoring solution as shareware. Over 10,000 new subscribers every month select DVDMotion for authoring, compiling, premastering, and recording DVD and VCD titles. DVDMotion Pro is the only tool set providing all this support in one package for under \$900.

Neato 250 Dodge Avenue East Haven, CT 06512 800/984-9800, 203/466-5170 Fax 203/466-5178 <http://www.neato.com>

Neato allows users to create custom labeling and packaging for CDs, videos, business card CDs, and other media using the NEATO 2000 CD Labeler Kit along with NEATO labels and insert products. The kit allows users to design, print, and apply custom CD labels. NEATO CD labels come in a variety of high-quality finishes, including High Gloss, PhotoMatte, and EconoMatte. With the NEATO HandiCD Labeler Kit, users can create multimedia CD business cards, then label and package them using NEATO HandiCD Labels

and HandiCD Sleeves.

Netstal-Maschinen AG P.O. Box 8452 Naefels Switzerland +41 55 618 61 11 Fax +41 55 618 66 05 <http://www.netstal.com>

For more than 50 years, the Swiss company Netstal-Maschinen AG has supplied highly precise, fast-cycling plastic injection moulding machines with clamping forces from 60 to 600 tons. The fully electronic, closed, loop-controlled machines satisfy the highest demands in terms of process management, quality, and production output. Netstal's equipment is primarily used to produce demanding technical and thin-walled plastic parts. A network of its own distribution and service companies as well as free agents gives Netstal a presence in more than 40 countries on five continents. All subsidiaries and most agencies benefit from a comprehensive infrastructure offering sales advice, reliable service, and rapid deliveries of spare parts.

Newbridge Associates, Inc. 19 Marie Terrace West Orange, NJ 07052 973/325-8400; Fax 973/325-0008

Newbridge Associates, Inc. has more than ten years experience in the magnetic and optical media business. We are a VAR for Rimage and provide all types of CD-R, CD-ROM, and DVD products and services.

NewTech Infosystems, Inc. 1395 Warner Avenue Tustin, CA 92780 714/259-9700; Fax 714/259-9727 <http://www.ntius.com>

NewTech Infosystems, Inc. is a first-tier software developer focused on CD recording and backup application software since 1994. Our recording and backup products support the combination of data, video, and audio formats, and currently support nearly 500 CD-R/RW drive models. All products are based on our latest fourth-generation recording engine technology. NTI offers CD Maker, a general-purpose recording package supporting the combinations of audio, video, and data, and Backup NOW!, which features full and partial restores, scheduler, and creation of recovery CDs. Our products are available in OEM and retail configurations, localized for worldwide use.

NewWave Technologies, Inc. 200 Girard Street Gaithersburg, MD 20877 301/948-5222; Fax 301/948-5883 <http://www.newwavetech.com>

NewWave Technologies, Inc. is a nationally recognized, value-added distributor focusing exclusively on imaging, document management, mass storage, and audio/video solutions. NewWave sells exclusively to VARs and systems integrators. NewWave has distribution alliances with world-class suppliers for a full range of storage and **digital** content management products, including DVD, CD, and tape libraries; RAID; SANs; network connectivity; **digital** asset management; document scanners; optical/CD drives and jukeboxes; CD-R/DVD-R recorders, duplicators, and towers; and image controller boards. NewWave distributes CD and DVD authoring tools, software solutions for optical and CD file management, and document management and workflow. Nationwide on-site maintenance programs are available.

NEXPAK 6370 Wise Avenue, N.W. North Canton, OH 44720 330/490-2000; Fax 330/490-2011 <http://www.nexpak.com>

NEXPAK is the result of the best leaders in the media packaging industry (Joyce Molding, Atlanta Precision Molding, California Precision Molding, Europe Precision Molding BV, Mercury Foam, and Alpha Media Packaging) coming together to offer innovative media packaging solutions to customers worldwide. NEXPAK offers the largest supply of media packaging for DVD, CD, video, audio, and professional formats as well as the broadest selection of packaging solutions. NEXPAK works every day to bring new innovations into the media-packaging marketplace.

Nimbus Technology & Engineering Limited (USA) P.O. Box 5125 Richmond, VA 23220-0025 804/354-1001; Fax 804/354-1004 <http://www.nimbus.ltd.uk>

Nimbus Technology & Engineering Limited (NTE), with offices in the U.K., U.S., and Asia, is a world-leading company specializing in the manufacture of optical disc mastering systems. NTE offers a mastering solution for every budget, production, and throughput requirement. NTE's

equipment range includes the New Mastering System--a fully integrated mastering system for CD or DVD--single and dual laser beam recorders for all prerecorded and recordable formats, and the Electron Beam Recorder for mastering future generations of formats of 100GB+ per side.

NSM Storage Inc 275C Marcus Boulevard Hauppauge, NY 11788
631/273-4600; Fax 631/273-4827 <http://www.nsmstorage.com>

NSM Modular Design Series Jukeboxes offer a complete range of data storage systems based on CD and DVD technology. Four models each combine fast read and write performance with optimal media handling to provide solutions for an unlimited range of data storage requirements. NSM Modular Series models can be equipped with the latest CD and DVD drives to provide storage and access to CD-ROM and DVD-ROM discs, and to record individual or multiple CD-R discs. In addition, they provide hundreds of gigabytes of data storage on reliable DVD-RAM media. All three technologies can be combined into a single, efficient data storage device.

Oak Technology, Inc. 139 Kifer Court Sunnyvale, CA 94086-5160
408/737-0888; Fax 408/737-3838 <http://www.oaktech.com>

Oak Technology, Inc., a leading provider of solutions for the storage, capture, and sharing of **digital** content, is committed to driving the emerging world of connected information appliances. The company's fully integrated products and technologies target two key markets: optical storage (CD-RW and DVD for PC and consumer) and **digital** imaging (advanced copiers, printers, faxes, scanners, MFPs, and I-Appliances). Founded in 1987, Oak is headquartered in Sunnyvale, CA, and has sales offices, design centers, and research facilities around the world. Oak trades under the symbol Nasdaq: OAKT.

Octave Systems, Inc. 504A Vandell Way, Campbell, CA 95008
800/626-8539, 408/866-8424 Fax 408/866-4252 <http://www.octave.com>

Octave Systems sells quality, top-rated CD recorders, CD duplicators, recording software, CD-R media, and CD writing accessories. Our low, competitive prices and outstanding personal service make Octave the place to visit for all your CD recording needs.

O'DIXION Inc. 1778 W. Sam Houston Parkway N. Houston, TX 77043
713/465-7488, +33 233 890 500 Fax +33 233 890 501 <http://www.odixion.com>

O'DIXION is a French company that specializes in designing CD/DVD creation solutions dedicated to the office environment. Created in 1998 by Jacques Bordes, the current CEO, O'DIXION's 35-person team is comprised of 60% engineers and executives coming from IT companies. O'DIXION proposes a complete CD/DVD duplication and systems range dedicated to the professional market, and exports its products all over the world. Concurrently the company develops a technology valorization program, via O'DIXION technology, which will generate Internet-based projects, such as CD-on-demand. As of September 2000, O'DIXION finalized the establishment of a subsidiary in Houston, Texas.

On Video.com 2445 McIver Lane, Suite 108 Carrollton, TX 75006
972/406-9292; Fax 972/406-9595 <http://www.onvideo.com>

On Video.com provides a variety of services, including video duplication; standard conversion (NTSC, PAL, SECAM); and film transfers (super 8, 8mm, 16mm). On Video.com also offers **digital** production and nonlinear editing; presentations on video and CD-ROM; and CD-ROM and multimedia services, including duplication, printing, authoring, and packaging. The company offers encoding for video and audio (DVD, MPEG, AVI, QuickTime) and Internet services, such as Web site consulting and design, advanced programming, hosting, and Web site CD-ROMs.

Optibase 3031 Tisch Way, Plaza West, Suite 1 San Jose, CA 95128
408/260-6760; Fax 408/244-0545 <http://www.optibase.com>

Optibase provides high-quality, cost-effective server platforms that enable MPEG video streaming over broadband networks. The company's products are used in applications, such as distance learning, business TV, **digital** video archiving, and video ecommerce. Optibase is also leading the way in MPEG-4 and transcoding technologies for the next-generation broadband Internet. Founded in 1990, Optibase is a publicly

traded company (NASDAQ: OBAS) with headquarters in Herzliyya, Israel and operates in North America through its fully owned subsidiary, Optibase, Inc.

Optical Laser Inc. 5702 Bolsa Avenue, Suite 100 Huntington Beach, CA 92649 800/776-9215, 888/224-6851 Fax 714/379-4413
<http://www.opticallaser.com>

Optical Laser Inc. is a full-service distributor of document imaging, **digital** video, and mass storage solutions. We offer premium hardware and software solutions for use in document capture, index, and storage management and retrieval applications. Products include application and toolkit software, highspeed scanners, image processing boards, and drive and jukebox products that utilize the technologies of magneto-optical, CD-Recordable, DVD-Recordable, DVD-RAM, RAID, and DLT tape. Optical Laser's service division, Imaging 501, provides training, installation, and maintenance contracts that help customers maximize their imaging investment.

OptiMedia, Inc. 1525 Huguenot Road Midlothian, VA 23113
800/775-0949, 804/794-5852 Fax 804/794-6194 <http://www.optimedia-usa.com>

OptiMedia, Inc. was formed in 1991 to provide mass storage media and hardware to distributors, resellers, and OEM customers. Since that time, the company has grown to become a successful value-added imaging and mass storage distributor. Strong customer relationships, superior service, and competitive pricing have allowed OptiMedia to maintain consistent growth. More importantly, the company continues to effectively and efficiently meet the needs and requirements of its clients. Whether it be imaging/ mass storage hardware, software, or media, OptiMedia is prepared to respond to the changing needs of its clientele with innovative solutions.

Optivision 3450 Hillview Avenue Palo Alto, CA 94304 800/239-0600
650/855-0200 Fax 650/855-0222 <http://www.optivision.com>

Optivision supplies network-based streaming video solutions for broadband multimedia applications, such as distance learning, content distribution, corporate training, ecommerce, telemedicine, and surveillance. The company's products provide the key network infrastructure and hardware and software enabling products for MPEG streaming video applications supporting industry-standard IP, ATM, and WAN-based networks. The company sells its solutions through the cooperation of network and video server partners, such as Cisco, 3Com, SGI, and others. In addition, the company has developed a network of system integrators who focus on turnkey streaming video applications for the enterprise.

Optoma Corporation No 11, Li-Hsin Rd Science Based Industrial Park HsinChu Taiwan 300 R.O.C. +886 3 577 2000 7229, +886 3 577 2000 7231 Fax +886 3 5797957 <http://www.optoma.com.tw>

Optoma, formerly known as CTX Opto, was founded in 1991 with a mission to become a leading provider of innovative display solutions worldwide, and is now one of Taiwan's leading developers of high-tech products. Optoma has earned a solid reputation for delivering cutting-edge LCD-related products that serve different application environments. Drawing on its experience in the fiercely competitive high-tech arena, Optoma has grown to deliver a range of truly innovative display products that includes ultra-portable LCD projectors, mainstream LCD monitors, thin-client terminals, and LCD backlight. Optoma's products represent some of the lightest and brightest in the industry, incorporating new-generation optical, electronic, and mechanic technologies.

Padus, Inc. 3880 South Bascom Avenue Suite #216 San Jose, CA 95124
888/GOPADUS, 408/377-0300 Fax 408/377-0303 <http://www.padus.com>

Padus Incorporated is a privately-held firm with headquarters in San Jose, California. Padus is focused not only on CD duplication but on other optical disc technologies, including CD and DVD mastering, data and multimedia publishing, archiving and retrieval solutions for the industry, business and single users. Padus' mission is to deliver professional-quality multimedia products and technologies at a fair price.

We have more than a decade of combined experience in the optical media field; at Incat Syand developed Easy-CD Pro.

Panasonic Document Imaging Company 2 Panasonic Way 7D-9 Secaucus, NJ 07094 800/742-8086, 201/348-7000 Fax 201/392-4504 <http://www.panasonic.com>

Panasonic Document Imaging Company (PDIC) offers the latest in DVD technology. Emerging as a worldwide standard, DVD-RAM offers reliable, high-capacity, removable storage. Our DVD-RAM drive, the LF-D201U, offers a maximum capacity of 9.4GB, with room to store thousands of full-color **digital** pictures, hours of MPEG-2 video, and CD-quality audio. The LF-D201U drive conforms to the latest specifications published by the DVD Forum.

Panasonic Industrial Company 1600 McCandless Milpitas, CA 95035 408/945-5615; Fax 408/946-3753 <http://www.panasonic.com>

Panasonic has introduced some of the world's most innovative DVD products to the market, including 2.6GB and 4.7GB rewritable DVD-RAM, the world's first portable DVD player with built-in LCD screen, DVD-Audio players, DVD-Video and DVD-Audio players for automobiles, and the world's first TV/DVD/VCR Combination. Its **Digital** Video Compression Corporation (DVCC) performs DVD encoding, artistic authoring, and services for motion picture transfer. Panasonic Disc Services Corporation (PDSC) performs mastering, mastering, and replication of discs for DVD and DVD-ROM products.

PE Logic 1000 S. Palm Canyon Drive Palm Springs, CA 92264 888/735-6442 760/318-0388 Fax 760/318-0488 <http://www.pelogic.com>

PE Logic, a developer of controller card and device drivers using Basic, Assembly, C, and C++, also develops low-level code writing for the Internet in Cold Fusion and Java. PE Logic is a hardware design and layout operation with made-in-America manufacturing and production testing experience.

Philips Consumer Electronics 64 Perimeter Center East Atlanta, GA 30346 770/821-3402; Fax 770/821-3876 <http://www.pcstuff.philips.com>

Philips is the undisputed world leader in CD-ReWritable drive manufacturing, holding more than a third of the total CD-RW market share worldwide. Offering high-speed internal and external CD-RW drive kits through most computer retail outlets nationwide, Philips ranks number two, worldwide, in branded CD-RW kits. Philips Consumer Electronics Company is a part of Royal Philips Electronics of the Netherlands, and is one of the world's largest electronics companies, with sales of \$33.5 billion in 1999.

Philips Disc Systems/ Philips ProDVD c/o Videotronic North America L.L.C. 3926 Varsity Drive Ann Arbor, MI 48108 734/668-9515, 877/767-8862 <http://www.prodvd.philips.com>

Philips ProDVD players and accessories are designed for commercial kiosk and training applications, with features and accessories exclusively designed for professional and industrial applications. Contact Videotronic North America to become a dealer or for further information.

Pinnacle Micro 30191-A Av. de las Banderas Rancho Santa Margarita, CA 92688 800/553-7070, 949/635-3000 Fax 949/635-3020 <http://www.pinnaclemicro.com>

Pinnacle Micro is a leading manufacturer of optical storage technology and recordable CD/DVD storage systems for general data storage and data-intensive applications, such as network storage, imaging, desktop publishing, and prepress, as well as emerging applications, such as **digital** audio/ video editing and commercial multimedia. Founded in 1987, Pinnacle Micro, Inc. is headquartered in Rancho Santa Margarita, California.

Pioneer New Media Technologies, Inc., Industrial Display Division 2265 E. 220th Street Long Beach, CA 90810 800/926-4329, 310/952-2111 Fax 310/952-2990 <http://www.pioneerusa.com>

The Industrial Display division of Pioneer New Media Technologies, Inc., headquartered in Long Beach, California, is a leading provider of plasma display and video wall products for the industrial market. The company delivers a host of innovative display solutions for a wide variety

of professional industries and broadcast applications. Pioneer New Media Technologies, Inc., is a subsidiary of Pioneer Electronic Corporation.

Pioneer New Media Technologies, Inc., Industrial Video Division 2265 E. 220th Street Long Beach, CA 90810 800/LASER-ON, 310/952-2111 Fax 310/952-2990 <http://www.pioneerusa.com>

The Industrial Video Division of Pioneer New Media Technologies drives the development of technology for professional DVD applications with a complete line of innovative products. Pioneer's Industrial DVD-Video player (DVD-V7400) serves a wide range of business applications, including presentation, broadcast, corporate training, POP/kiosk, and K-12 education. Pioneer also offers DVD bar code readers and Bar `n' Coder Software, which allows users to create and print their own DVD barcodes to target specific audio and video segments on a DVD-Video disc.

Pioneer New Media Technologies, Inc., Optical Systems Division 2265 E. 220th Street Long Beach, CA 90810 800/926-4329, 310/952-2111 Fax 310/952-2990 <http://www.pioneerusa.com>

Pioneer New Media's Optical Systems Division represents the professional and industrial side of Pioneer's complete line of optical, DVD, and storage-related technologies. The optical group currently provides the industry's most advanced DVD-ROM, DVD-R, and DVD-R/RW drive technologies. To compliment recordable DVD are the mass storage CD/DVD libraries featuring 100- and 700-disc base jukebox configurations for variable-format asset management. In addition, the optical systems division is also a leading OEM supplier of optical drives to top PC manufacturers.

PixelTools Corporation 10721 Wunderlich Drive Cupertino, CA 95014 408/374-5327; Fax 408/374-8074 <http://www.pixeltools.com>

PixelTools Corporation is a leading provider of MPEG and DVD software tools for professionals. These include: SimpleDVD, for creating DVD files; DVD-Plug-in for Adobe Premiere; MpegRepair, for encoding, decoding, demuxing, editing, and analyzing MPEG streams; MpegRepair, for MPEG-1/2, VBR, and HDTV video encoding; Expert-Audio, an MPEG Audio encoder/decoder; Expert-Multiplex, a software multiplexer which creates MPEG-1 System, MPEG-2 program, and VideoCD streams; and Expert-DVD, a high-quality software MPEG video encoder for controlling all the parameters of the MPEG encoding process.

Plasmon PLC 4425 Arrows West Drive Colorado Springs, CO 80907 719/593-4077; Fax 719/593-4597 <http://www.plasmon.com>

Founded in 1987, Plasmon PLC provides the industry's most complete line of jukeboxes, drives, and media based on CD/DVD, 5.25" MO, 12" WORM, and tape technologies. Principal products include jukeboxes, media, and enabling software. Manufacturing operations for media and software products are based at its U.K. headquarters while drives, jukeboxes, and associated robotics are developed and manufactured in Minneapolis and Colorado by two U.S. divisions, Plasmon IDE and Plasmon LMS. The company currently has 500 employees.

Plextor Corporation 4255 Burton Drive Santa Clara, CA 95054 800/886-3935, 408/980-1838 Fax 408/986-1010 <http://www.plextor.com>

Plextor Corporation is a leading developer and manufacturer of high-performance CD-related equipment and software.

Ponica Industries Corp., Ltd. 425 N. Smith Avenue Coroca, CA 92880 909/371-5781; Fax 909/371-2869 <http://www.ponica.com>

Ponica manufactures and distributes a variety of injection-molded CD and DVD boxes and cases. Our patented EastPack TM DVD Box offers push-button design. The EastPack TM 2DVD box is also available. Our Multi-CD packs, Slim3, and SuperSlim are other innovative options for your packaging needs. EastPack DVD boxes, CD jewel cases, and 2CD SmartTrays are qualified for automated packaging equipment. Ponica has sales and distribution centers on the west and east coasts of the United States.

PowerFile 718 University Avenue, Suite 100 Los Gatos, CA 95032 877/8DVDNOW Fax 408/354-6322 <http://www.dvdchanger.com>

PowerFile introduces a new category of easy and affordable near-line storage solutions. With the PowerFile C200 DVD/CD Changer, you can store,

manage, and retrieve DVD/CD media across a network. This IEEE1394/FireWire peripheral includes two DVD-ROM drives and 200-disc capacity, providing about a terabyte of **digital** storage. The C200 includes client/server library management software for both Macintosh and Windows (unlimited client licenses). The PowerFileCumulus bundle offers more detailed cataloging, integrating the C200 Changer with Canto's Cumulus 5 **Digital** Asset Management software.

Prassi Europe SARL 75 Bd. Oyon Technopole Navaxis Le Mans 72100 France +33 2 4357 3450 Fax +33 2 4357 3459 <http://www.prassieurope.com>

Prassi Europe SARL was founded in 1999 in Le Mans, France. The company was established to provide a worldwide freedom of choice in easy-to-use yet remarkably advanced CD and DVD recording software. Prassi offers complete solutions for CD recording for both consumer and professional users alike. PrimoCD Plus, our consumer application, offers the full range of CD recording capability, including CD copying, CD-Text, and VideoCD creation. Our professional CD duplication package, PrimoCD Pro64, supports up to 64 recorders simultaneously and records multiple different jobs. Prassi's product line also includes PrimoDVD for DVD premastering, and PrimoSDK, an API toolkit for CD and DVD recording.

Prassi Software USA, Inc. 1731 Technology Drive, Suite 490 San Jose, CA 95110 408/573-9100; Fax 408/573-8100 <http://www.prassieurope.com>

Prassi Software USA is the sales representative for Prassi Europe in the United States.

Precision Data Systems 340 Hambridge Court Lawrenceville, GA 30043 770/339-0145; Fax 770/614-3866 <http://www.precisiondatasystems.com>

Precision Data Systems Inc. is a reseller/ integrator of document management systems, mass storage, and CD publishing and duplication systems. Precision Data Systems handles Rimage, Kodak, Hitachi, Pioneer, Maxoptix, Onstream, Cedar, Ricoh, Pioneer, Plasmon, NSM, MediaFORM, Raidtec, Kofax, Panasonic, Sony, Quantum, Hewlett-Packard, Smart Storage, Spectra Logic, Exabyte, Quantum, OTG, and Tracer.

Primera Technology, Inc. Two Carlson Parkway North Plymouth, MN 55447-4446 800/797-2772, 763/475-6676 Fax 763/475-6677 <http://www.primeratechnology.com>

Primera Technology, Inc. is a leading manufacturer of CD-R/DVD-R duplication and printing equipment, including the new Composer Optical Disc Duplicator, Inscripta Thermal CD Printer, and the popular Signature III CD Color Printer. Composer is a low-cost, automatic duplication system that can be configured for either CD-R or DVD-R. It duplicates and optionally prints up to 50 discs per job with Primera's inkjet Signature III or Inscripta Thermal CD Printer. Both optical disc printers are also available as standalone printers.

Pro Tape Northwest 2412 2nd Avenue Seattle, WA 98121 800/331-6107, 206/1441-8273 Fax 206/728-7523 <http://www.protapenw.com>

Pro Tape Northwest sells blank audio and video recording tape, blank data storage media, and CD-R and CD duplication and audio cassette duplication services. Conveniently located in downtown Seattle or shop online! Visa, MasterCard and Discover spoken here! Open 9am to 5pm Pacific time, Monday through Friday.

Procom Technology 58 Discovery Irvine, CA 92618 800/800-8600, 949/852-1000 Fax 949/852-1221 <http://www.procom.com>

Procom is a pioneer in networked data storage, providing affordable high-performance data access and protection solutions for almost a decade. The company produces network-attached storage (NAS) solutions for enterprise, workgroup, ISP, and ecommerce applications featuring proprietary embedded software for seamless integration of NAS into all major networking environments. Technological breakthroughs include the first plug-and-play protected data storage appliance for workgroups, and "virtual zero downtime" symmetric fault tolerant filers for ecommerce applications.

Professional Image Printing and Packaging 12437 East 60th Street Tulsa, OK 74146 918/461-0609; Fax 918/249-2602 <http://www.pi-pkg.com>

Professional Image is a specialty, high-end printing and packaging company specializing in CD, computer software, multimedia, audio, and video. Offering "single-source solutions," Professional Image provides graphic design, structural packaging design, prototypes, **digital** photography, **digital** asset management through the Internet, scanning, **digital** color film separations, replication, duplication, short- and long-run printing, fulfillment, and distribution services. Services include 1-5-plus color printing, film lamination, UV coating, environmentally friendly aqueous coating and recyclable stocks, embossing, foil stamping, and more.

Proxima 9440 Carroll Park Drive San Diego, CA 92121 888/PROXIMA 858/457-5500 Fax 858/677-5653 <http://www.proxima.com>

Proxima, a subsidiary of InFocus Corporation (NASDAQ: INFS), develops, manufactures, and markets high-resolution multimedia projectors and presentation technology for PCs, workstations, audio-visual, and video industries. As one of the world's leading data/ video projector brands, Proxima offers a wide range of multimedia projectors, audio and video conferencing equipment, and presentation tools to increase the efficiency and productivity of its customers. For more information about Proxima products and its worldwide network of VARs, major distributors and resellers, visit our Web site or call our toll-free number. The company recently launched an ecommerce store, <http://www.ePresenter.com>, specifically designed as a one-stop shop for presentation tools and accessories.

QDesign Corporation 1035 Cambie Street Vancouver BC V6B 2Y1, Canada 604/688-1525 Fax 604/688-1524 <http://www.qdesign.com>

QDesign is a leading provider of audio compression technologies for the Internet, new media, and broadcast industries. QDesign's products include QDX, MP3 and MP2 technology, as well as the QDesign Music Codec for Apple's QuickTime platform.

Qfactor, Inc. 7920 Norfolk Avenue, Suite 800 Bethesda, MD 20814 301/656-4040 Fax 301/656-2454 <http://www.qfactor.com>

Qfactor, Inc. is one of the largest independent interactive advertising agencies. The company is exclusively focused on assisting businesses in planning, implementing, and managing online advertising and marketing campaigns. Qfactor, Inc. has earned an industry-wide reputation by continually focusing upon optimizing campaign performance such that client objectives are consistently achieved or exceeded. Qfactor, Inc. provides clients with total account management: strategic marketing planning, in-depth market research, creative management, media planning and placement, and contract negotiations services.

RAVISENT Technologies Inc. 205 Great Valley Parkway Malvern, PA 19355 800/700-0362, 610/251-9999 Fax 610/695-2592 <http://www.ravisent.com>

RAVISENT Technologies Inc. provides **digital** video, audio, and Internet appliance technology to industry-leading PC, consumer electronic and Internet appliance OEMs, empowering them to deliver highly competitive, cost-effective products with a strong time-to-market advantage. RAVISENT software and intellectual property is contained in products from Compaq, Dell Computer, Gateway, Hewlett-Packard, Micron, Fujitsu, Quantex, Sony, Tottori-Sanyo, Vestel, Yamaha, ATI Technologies, C-Cube, ST Microelectronics, Telecom Italia, Formenti, and IPM. Founded in 1994, RAVISENT has offices in Silicon Valley, Seattle, Germany, and Japan.

Record Products of America, Inc. 700 Sherman Avenue Hamden, CT 06514 203/248-5371; Fax 203/248-3733 <http://www.recordproducts.com>

RPA manufactures CD stacking spindles, stacking spindle carts, and CD Stack Counting Machines. RPA also makes high-quality stamper finishing equipment, including I.D. & O.D. Optic Stamper Punches, Stamper Backsanders, and Tape Apply Machines. Products include sputtering targets, galvanics electroforming workholders, and a wide variety of sandpaper and tape consumables to support the optical disc industry. All sales and technical support comes direct from your stamper finishing partner at Record Products of America.

Ricoh Corporation, DMS-C One Ricoh Square, 1100 Valencia Avenue
Tustin, CA 92780 714/566-2548, 714/565-3245 Fax 714/555-3266
<http://www.ricohdms.com>

Headquartered in Tustin, CA., Ricoh DMS-C (Disc, Media, and Systems Center), an operating unit of Ricoh Corporation, is a major OEM and supplier of CD-R/RW drives, optical storage products, recordable media, and related software products. DMS-C is one of the original consortium members who developed the CD-RW (rewritable) industry specifications, and the first manufacturer to market a CD-ReWritable disc drive. Ricoh holds many worldwide patents, including one for CD-RW media.

Rimage Corporation 7725 Washington Avenue South Minneapolis, MN
55439 612/944-8144; Fax 612/944-7808 <http://www.rimage.com>

An innovator in CD-R/DVD-R technology, Rimage designs and manufactures state-of-the-art equipment to fit any production need from casual office environment to on-demand network configurations to high-volume mass customization solutions. Rimage pioneered the first integrated diskette system, the first integrated CD-R system, the first thermal transfer printer, and the first DVD-R integrated system. Rimage systems are used in industries, such as finance, audio, and telecommunications for a variety of applications, including billing, payroll processing, check imaging, and on-demand music/video.

Rising Edge Technologies 1110 Elden Street, Suite 301 Herndon, VA
20170 703/471-8108; Fax 703/471-8195 <http://www.risingedge.com>

Rising Edge Technologies develops intelligent storage controllers designed to bring the benefits of optical storage media online. From its groundbreaking Optical RAID released in 1996 to its current line of Jukebox Servers, the company focuses on delivering technology to help you achieve more with your DVD and MO storage devices. Its hardware solutions achieve better performance, higher capacity, and increased availability for optical storage applications without the need for specialized software.

Roxio, Inc. 451 S. Milpitas Boulevard Milpitas, CA 95035
408/945-8600 Fax 408/957-4544 <http://www.roxio.com>

Roxio, Inc. is the leading provider of **digital** content management software for PC end-users. Flagship products include Easy CD Creator and Toast, popular software for Windows and Macintosh CD recording. Roxio's line of software products enables individuals to personalize and store music, photographs, video, and data onto recordable CDs. Roxio also markets system protection software, GoBack, that provides quick recovery from system crashes, virus attacks, failed software installations, and data loss. Roxio is a wholly-owned subsidiary of Adaptec, Inc.

SANYO Sales & Supply 900 N. Arlington Heights Road, Suite 300
Itasca, IL 60143 630/775-0404, 630/875-3513 Fax 630/775-0044
<http://www.sanyo.com>

For Original Equipment Manufacturers (OEM), SANYO Sales & Supply Company (SSS) provides finished products, such as microwave ovens and vacuum cleaners. It also supplies OEM manufacturers with components, such as compressors, LCD displays, control circuit boards, and CD-RW drives.

SANYO-Verbatim CD Company 1767 Sheridan Street Richmond, IN 47374
800/704-7648, 765/935-7574 Fax 765/935-0174 <http://www.sanyo-verbatim.com>

SANYO-Verbatim CD Company is a 14-year provider of quality disc replication services. As an ISO 9002-certified independent manufacturer of CD-Audio, CD-ROM, DVD, and game console discs, we emphasize project management and a complete selection of replication services to assist your every need. We offer replication, mastering, six-color silkscreen printing, packaging, distribution, pick and pack, shipping, and dedicated customer service and distribution service support. Let our team bring your work to life.

Saturn Solutions 6520 Abrams St. Laurent, Quebec H4S 1Y2, Canada
888/286-5656, 514/856-5656 Fax 514/856-5657 <http://www.saturndisc.com>

Established in 1983, Saturn Solutions is a global, turnkey service provider to the **digital** media industry. Saturn's services include replication of software and music onto CD-ROM, DVD, and diskette;

premastering and glass mastering; customized product packaging and assembly; print services; electronic order processing; Web-based inventory management, warehousing, fulfillment, and distribution worldwide. Seamless turnkey production and fulfillment services provide the speed and flexibility demanded by our clients' fast-paced business needs, with state-of-the-art manufacturing and distribution plants in North America and Europe.

SF Video, Inc. 1548 Stockton Street, 2nd Floor San Francisco, CA 94133 800/545-5865, 415/288-9400 Fax 415/288-9410 <http://www.sfvideo.com>

SF Video, Inc. specializes in volume video/audio duplication; CD/DVD authoring and replication; and printing, packaging, and fulfillment at really low prices. Experienced, knowledgeable, fast, friendly service. Guaranteed quality. We duplicate orders for every type of business imaginable, including advertising, corporate/industrial, infomercials, special interest, sports marketers, etc. We also specialize in video direct mail.

Silicon Valley CD, Inc. 990 Richard Ave, Suite 103 Santa Clara, CA 95050-2828 800/255-4020, 408/486-0800 Fax 408/486-0809 <http://www.svcd.net>

Silicon Valley CD manufactures compact discs and related packaging. We've been in business since 1992, specializing in short replication runs of 100 to 25,000 units. For small, time-critical runs, we offer CD-R silk-screening, duplication, and packaging with turnarounds of 24-72 hours. Our traditional CD and DVD replication packages stress turnkey convenience, with one-stop replication, printed packaging, and assembly for an all-inclusive price that includes film output and color proofs. Customers include small and large business, education, and government markets.

SIM2 Multimedia S.p.a. Viale Lino Zanussi, 11 Pordenone 33170 Italy +39 0434 383201, +39 0434 383281 Fax +39 0434 383241 <http://www.sim2.it>

SIM2 develops, manufactures, and markets products and systems for the display of new media. Specifically, SIM2 activities focus on two segments: large display and video entertainment applications. The large display business line covers display walls for control rooms (military applications, transport and traffic control, etc.), meeting rooms (corporate, institutional, educational, etc.), **digital** merchandising (hypermarkets, shopping centers, etc.), and large events (exhibitions, broadcasting studios, etc.). The video entertainment line has one of the widest and most diversified range of products covering all types of needs--from home theater to bars and public venues, discos, and other applications.

Smart Storage Inc. 100 Burt Road Andover, MA 01810 888/479-0100, 978/623-3300 Fax 978/623-3310 <http://www.smartstorage.com>

Smart Storage is a leading provider of standards-based data storage management and data access software for Windows NT/2000, UNIX, and NetWare environments. SmartStor software supports a wide range of media, including DVD-ROM, DVD-RAM, DVD-R, CD-ROM, CD-R, MO, WORM, and tape. The software provides increased data accessibility, primary storage scalability, and seamless data migration, which allow enterprises and their end-users to leverage data across the entire organization without interruption. SmartStor products have been installed at over 10,000 corporations and government agencies worldwide.

Software Logistics Inc. 7330 Victoria Park Avenue, Building B Markham, Ontario L3R 1J1, Canada 888/216-2382, 905/513-0754 Fax 905/513-0920 <http://www.swlogistics.com>

Software Logistics provides fast turnaround of 1-6-color CD-R, business card CD printing and packaging. Software Logistics is also the exclusive distributor of the MediaShaper 2000 CD/DVD shaping machine (<http://www.mediashaper2000.com>). High-speed CD/DVD shaping service also available; dealer/trade pricing; quick-turn, high-volume CD/DVD manufacturing; USPS CD mailing; Canadian warehousing and fulfillment. All services available in U.S. and Canada.

Sonic Desktop Software 9836 White Oak Avenue, Suite 209 Northridge, CA 91325 818/718-9999 Fax 818/718-9990 <http://www.smartsound.com>

Sonic Desktop is the maker of the SmartSound family of audio software products. These audio software products were designed to allow visual content creators to create soul-stirring soundtracks customized specifically for their video and visual projects. It is the first audio software on the market designed to fill the needs of visually-oriented people--not musicians or sound engineers--so that they can create the soundtracks they need for their projects quickly, effectively, and with completely professional results.

Sonic Solutions 101 Rowland Way Novato, CA 94945 888/SONIC4U, 415/893-8000 Fax 415/893-8008 <http://www.sonic.com>

Sonic is the world's leading supplier of authoring systems for **digital** media production. Beginning in 1986, Sonic set the standard for quality, productivity, and creativity for **digital** audio workstations, and followed this with the introduction of the first commercial systems for DVD production in 1996. Today, Sonic offers a full line of DVD authoring systems--from professional workgroups designed for Hollywood studios to desktop applications that bring DVD. Today, more DVDs worldwide are authored on Sonic than on all competing products combined.

Sonopress LLC 850 Spice Islands Drive Sparks, NV 89431-7103 775/353-7000 Fax 775/353-7008 <http://www.sonopress.com>

Sonopress, a Bertelsmann company, is one of the world's largest manufacturers of optical discs. Besides CD, CD-ROM, and DVD replication (as well as audiocassette duplication), Sonopress offers packaging, kitting, and fulfillment services to the audio, computer software, and home video industries. Together with its sister company, BMG Distribution, Sonopress offers turnkey and distribution solutions on the east and west coast that exceed 900,000 units per day. Sonopress brings your content to market.

Sony **Digital** Authoring Services 123 International Way Springfield, OR 97477 541/988-8000; Fax 541/988-7796 <http://sdm.sony.com/das>

Sony **Digital** Authoring Services, a unit of Sony Disc Manufacturing, provides content preparation services for audio, video, and multimedia content holders, including project planning, bit budgeting, asset capture, graphic interface design, authoring, emulation, and formatting for CD, DVD, broadcast, or the Web.

Sony Disc Manufacturing 1800 N. Fruitridge Avenue Terre Haute, IN 47804 800/358-7316, 603/891-4330 Fax 603/891-4333 <http://sdm.sony.com>

As the world's largest producer of pre-recorded optical discs, Sony Disc Manufacturing (SDM) supplies a full line of high-quality products and services for the education, entertainment, and information industries. Services include **digital** authoring, graphic design, mastering, replication, packaging, component procurement, inventory management, distribution, and fulfillment for audio cassette and CD, CD-ROM, DVD, SuperAudio CD, and PlayStation discs. SDM has four ISO-certified locations in the US: Carrollton, GA; Pitman, NJ; Springfield, OR; and Terre Haute, IN.

Sony Electronics Inc. 1 Sony Drive Park Ridge, NJ 07556 800/686-SONY, 201/930-6307 <http://www.sony.com/professional>

Sony Electronics' Broadcast and Professional Company (BPC) provides advanced products and systems for a variety of professional and broadcast markets, including production, corporate, industrial, government, security, medical, and education. Sony designs products and applications that facilitate the transition to **digital** technologies and the emerging broadband network era. Sony products and services include those for broadcast acquisition, production, storage, data management, system integration, **digital** imaging, **digital** printing, large and small venue display, projection, and replication test equipment needs.

Sony Precision Technology America, Inc. 20381 Hermana Circle Lake Forest, CA 92630 949/770-8400; Fax 949/770-8404 <http://www.sonypt.com>

Sony Precision Technology America, Inc. has developed a new CD Analyzing System Group that complies with the CD Reference Measuring Methods (CD-RMM). Our CD analyzer meets such demands for higher measuring

accuracy. Our system constitutes a complete CD analyzing system with the addition of the disc balance checker. Most recently, we introduced a DVD tester incorporating Sony's high-precision linear encoders with a dedicated optical block for precision measurement.

Spatializer Audio Laboratories Inc. 900 Lafayette Street Suite Santa Clara, CA 95050 408/296-0600; Fax 408/296-0650 <http://www.spatializer.com>

Spatializer Audio Laboratories, Inc. is a leading developer, licensor, and marketer of next-generation technologies for the consumer electronics, computing, and entertainment industries. The company's advanced audio technology is incorporated into consumer electronics audio, video, and DVD products from global brand leaders, including Toshiba, Panasonic, Samsung, Hitachi, Acer, Goldstar, Sharp, Sanyo, Zenith, and in PC multimedia systems and peripherals from Apple, Compaq, AST, Dell, Gateway 2000, Fujitsu, Seiko-Epson, NEC, Micron, and Labtec.

Spectrum **Digital** Services 600 Northshore Drive Hartland, WI 53029 800/491-4290, 262/359-1577 Fax 262/369-1578 <http://www.cdmfg.com>

Spectrum **Digital** Services specializes in CD-R silkscreen printing, duplication, and packaging. We ship orders in less than 72 hours after receipt of approved artwork. Spectrum **Digital** has a large inventory of popular name-brand and generic CD-R media. In-house processes include film output, five-color printing, mastering, high-speed duplication, and package assembly.

SPINITAR Presentation Products 10349 Heritage Park Drive, Suite 2 Santa Fe Springs, CA 90670 800/722-6444, 480/968-9178 Fax 480/784-1544 <http://spinitar.com>

Since 1986, SPINITAR Presentation Products has provided cutting-edge communications technology solutions in projection display, audio, data, video conferencing, and integrated room design and installation. Our focus solutions for business-to-business and government. We specialize in A/V for boardrooms, conference rooms, classrooms, training rooms, meeting rooms, and command and control centers. SPINITAR offers integrated engineering, installation, and system support services for lighting, audio, projection technology, remote control systems, computer/video interfacing, switchers, video-conferencing, and network collaboration.

Spruce Technologies, Inc. 1054 S. DeAnza Boulevard, Suite 200 San Jose, CA 95129 888/255-MPEG, 408/861-2200 Fax 408/863-9701 <http://www.spruce-tech.com>

Spruce Technologies was established in August 1996 to develop and market DVD authoring systems and MPEG encoders for the corporate, new media, and entertainment markets. DVDMaestro and DVDConductor, Spruce's award-winning authoring software packages, are the result of this effort and are currently being utilized in the corporate communications space to develop hybrid (DVD-ROM) titles with WebDVD interconnectivity, as well as by major Hollywood production facilities to produce thousands of DVD movie releases.

STEAG HamaTech, Inc. 77 Industrial Park Drive, P.O. Box 70 Saco, MA 04072 207/282-4698; Fax 207/282-9884 <http://www.steag-hamatech.com>

STEAG HamaTech Inc, Saco is a wholly-owned subsidiary of STEAG HamaTech AG, in Sternenfels and is the only company in the U.S. that develops and produces replication systems for the optical disc industry. For ten years, we have delivered state-of-the-art equipment for manufacturing CD-Audio/ROM and DVD worldwide. STEAG HamaTech Inc. together with the STEAG HamaTech AG form a world-class research and development department.

Stomp, Inc. 1012 Brioso Drive, #105 Costa Mesa, CA 92627 949/250-6771 Fax 949/250-6775 <http://www.cdstomper.com> <http://www.clicknburn.com>

Click'N Burn Pro is a new, robust, and full-featured CD mastering, recording, and duplication software package designed for anyone who wants professional results. You can easily turn LPs and MP3s into CDs; copy from one CD to **another**; easily create **data**, audio, and multimedia CDs on your PC; back up important

files, such as spreadsheets, tax records, financial data; and more. Stomp, Inc. also offers the award-winning CD Stomper CD/DVD Labeling System.

SuddenTrace Incorporated 7887 Fuller Road Suite 101 Eden Prairie, MN 55344 952/937-8338, 952/249-4900 Fax 952/937-8365
<http://www.suddentrace.com>

SuddenTrace's "one-button" CD duplicator finally makes it easy to protect your valuable software in three easy steps: 1) Insert the original software. 2) Insert the blank "Start" button. You have made an exact duplicate of your valuable CD for your protection. SuddenTrace does this without hooking up to your PC. It is a standalone burner anyone can master. Every lab, every office must protect their software with the SuddenTrace Duplicator.

Superdups 2500 Main Street, #204 Tewksbury, MA 01876 800/617-3877, 978/658-2502 Fax 978/988-1333 <http://www.superdups.com>

Superdups American Duplication Supply has been providing quality CD duplication products and services for over 15 years. Superdups offers turnkey solutions to create or expand any duplication setup. CD duplication towers, autoloaders, CD printers, labelers, and shrink-wrappers are among the many products available. A full line of media products are available as well, including Taiyo Yuden blank CD-R media, jewel cases, and paper/Tyvek CD sleeves. Superdups also offers full CD duplication services, including CD, CD-ROM, DVD, and cassette duplication.

T.S. Solutions Inc. 2133 Las Positas Court, Suite H Livermore, CA 94550 925/371-4690 Fax 925/371-4694 <http://www.ts-solutions.com>

T.S. Solutions offers a complete line of CD-R and floppy disk duplication equipment. Our unique, fully automated standalone and PC-connected systems, with a big input/output hopper capacity, use up to 12X drives and a convertible solution from inkjet to thermal color printer. We are also introducing the new Inscripta thermal printer integrated into our systems and single-drive, PC-connected office equipment. Take advantage of our best price on the market and three-year warranty!

TEAC America, Inc. 7733 Telegraph Road Montebello, CA 90640 323/726-0303; Fax 323/727-7672 <http://www.teac.com>

TEAC, a pioneer in both magnetic and optical recording technologies, manufactures a complete line of removable storage products for both desktop and notebook computers. TEAC is a world-leading supplier of CD-ROM, CD-ReWritable, DVD-ROM, and floppy disk drives. TEAC's latest CD-RW products make it faster and easier than ever to create your own custom CDs. These products include the high-performance CD-W512E 12x10x32 and the CD-W58E 8x8x32 CD-ReWritable drives.

Technicolor 3233 East Mission Oaks Boulevard Camarillo, CA 93012 800/732-4555, 805/445-1122 Fax 805/445-4280 <http://www.technicolor.com>

Technicolor provides global services in video duplication and CD/DVD replication; custom packaging, fulfillment, and distribution; and complete turnkey project management. As the world's leading independent packaged media manufacturer, Technicolor offers unparalleled service with ISO 9002 certification and round-the-clock operation in 17 locations worldwide. As a trusted partner, Technicolor ensures quick turnaround, on-time delivery, and even offers returns processing. High-volume capacity, state-of-the-art technology, and the ability to accept all internationally recognized formats make Technicolor the provider of choice.

Telepower the Netherlands b.v./DixxPli Eemweg 6 Baarn 3742 LB The Netherlands + 31 35 541 22 35 Fax +31 35 541 55 91 <http://www.dixxplic.com>

Telepower is the manufacturer of DixxPli CD Duplicators, a wide range of duplication equipment, including DixxPli Diskette Duplicators, DixxPli CD Duplicators, and DixxPli CD Printers. In order to give the best service possible, DixxPli has two offices: DixxPli Europe and DixxPli USA. With the recent introduction of the full automatic duplicators, DixxPli CD Auto Duplicator1 and DixxPli CD Auto Duplicator4, Telepower has made it possible to do fully automatic duplication for smaller organizations and IT departments.

TenXpert Technologies Inc. 13091 Pond Springs Road Suite 150 Austin,

TX 78729 877/633-3434 512/918-9119 Fax 512/331-4536

<http://www.tenxpert.com>

A standalone, 10/100 Ethernet-connected, NT, Novell, and UNIX NFS, CD/DVD network server with a large HDD cache, TenXpert provides cost-effective, high-performance, simultaneous access for large numbers of users to large numbers of CDs and/or DVDs (7 to 600+). Features include user license metering and CD/DVD recording. Totally plug-and-play, requiring no software to add to any server or client, TenXpert supports hardware from such manufacturers as Cygnet, DISC, Matsushita, Nakamichi, Panasonic, Pioneer, Plasmon, NSM, Plextor, TEAC, Toshiba, Yamaha, and Sony.

Texas Instruments 6550 Chase Oaks Road Piano, TX 75023 888/DLP-BY-TI
<http://www.dlp.com>

Texas Instruments' **Digital** Light Processing technology is pioneering a new era in **digital** projection. Working with leading manufacturers, DLP(salinity) technology serves a broad range of markets, from microportable and large-screen projectors to high-definition home entertainment and **digital** cinema. For any projection need, DLP(salinity) technology provides the premier solution.

Third Wave Media, Ltd. 5225 Wilshire Boulevard, Suite 700 Los Angeles, CA 90036 323/931-1746 323/931-1747 Fax 323/931-1748
<http://www.thirdwavemedia.com>

Third Wave Media offers world-class quality products and services, which include CD-ROM, CD-Audio, and VideoCD replication, as well as DVD replication, authoring, and mastering. Third Wave also provides audio and video cassette duplication, diskette, and CD-R duplication/printing, graphic design, and packaging. Third Wave also offers worldwide shipping and accepts all major credit cards. Third Wave's diverse customer base includes software publishers, software developers, record companies, recording artists, film and sound studios, post-production facilities, and data management services.

Ticket and Shape CD Inc. 7080 Hollywood Boulevard, #504 Los Angeles, CA 90028 323/464-4024 Fax 323/464-4026 <http://www.la-shapecd.com>

The Shape CD company, inventors and innovators with custom-shaped compact discs. We manufacture Shape CD, business card CD-ROMs and Shape DVD, Shaped CD-R, and Ticket CD, the only interactive ticketing medium.

TKO Media Inc. 9440 Telstar Avenue, Suite #2 El Monte, CA 91731 626/350-1520 Fax 626/350-3237 <http://www.tko-media.com>

TKO Media Inc. is a well-established master distributor for many CD-R and CD-RW manufacturers in the world, with expected 2001 annual volume at about 50 million units. With management background in the media storage market for over 15 years, TKO Media emphasizes quality and competitive prices. TKO Media also distributes DVD-R, DVD Box, and other CD-related products, such as CD Jewel Boxes, CD Labels, CD Counters, CD Chemicals, and CD Machines.

Tool Factory, Inc. 1929 Dorset Hill Road East Dorset, VT 05253 802/366-8253 802/366-8257 Fax 802/366-8170 <http://www.toolfactory.com>

Tool Factory is dedicated to publishing the world's most incredible software tools. We will launch 18 tools and applications into the educational market by March of 2001.

Toolex International N.V. Luchthavenweg 10/P.O. Box 7005 5506 JA Eindhoven Netherlands +31 40 2581 581 Fax +31 40 2541 985
<http://www.toolex.com>

Toolex International is a global company providing advanced equipment, process expertise, and services for optical media mastering and replication. Focused on three key business units--ODME (mastering), Toolex Alpha (prerecorded replication), and TREX (recordable replication)--Toolex International offers customer-oriented solutions incorporating leading-edge technologies and in-depth process know-how. Able to optimize solutions to customers' specific manufacturing processes, Toolex International is an industry leader in data handling, electroplating, injection molding, metallizing, and process control. Production support and services are delivered worldwide via regional offices in Europe, Asia, the U.S., and

Latin America.

TOSOH USA, Inc 383 E. Grand Avenue, Suite E South San Francisco, CA 94080 800/238-6764 650/615-4790 Fax 650/615-4791 <http://www.tosoh.com>

TOSOH manufactures rewritable and write-once MO disk cartridges for OEM and private-label customers around the world. TOSOH's complete production services include custom printing and packaging to meet the special requirements of OEM and private label customers. TOSOH's product line includes 3.5" (128MB to 640MB) and 5.25" (600MB to 9.4GB) media. TOSOH's MO products are 100% certified and are fully compatible with all ISO-compliant MO drives. Every TOSOH MO disk is guaranteed for over ten million rewrites.

Trace **Digital** 151 E. Brokaw Road San Jose, CA 95112 888/TRACE88 408/441-8040 Fax 408/441-7259 <http://www.tracedigital.com>

Trace **Digital** is a leading provider of duplication, automation, and printing solutions to the rapidly evolving CD recording market. Trace **Digital's** PowerWriter series of systems are used by companies to copy electronic files and print high-quality color images to CD-R media. Trace's reputation has always been based on developing and manufacturing innovative designs and solutions, as supported by the many patents held by Trace companies.

TREEV, Inc. 13900 Lincoln Park Drive, Suite 300 Herndon, VA 20171 800/254-0994 703/904-3168 Fax 703/481-6920 <http://www.treev.com>

TREEV enables customers to extend their mission-critical application investments by applying information content to business processes over the Web. TREEV's patented technologies are exemplified by TREEV 2000, its standards-based component architecture consisting of eTREE (Web portal), DocuTREEV (document management), DataTREEV (ERM), AutoTREEV (workflow), and OmniTREEV (content management). Headquartered in Herndon, Virginia, TREEV employs over 200 technology and services experts with over 2,000 customer installations worldwide.

UniMedia, Inc. 3507 Ryder Street Santa Clara, CA 95051 408/733-9999 Fax 408/773-9995 <http://www.unimediainc.com>

UniMedia, Inc. provides full services for your complete CD and DVD needs: CD and DVD replication, business card CD-R, shaped CD, CD-R, CD-RW, CD Pac, jewel case, CD and lens cleaner, and CD Duplication--with 100% quality warranty, and with the best prices and services.

Univenture Disc Packaging & Systems, Inc. 4707 Roberts Road Columbus, OH 43228 800/992-8262, 614/529-2100 Fax 614/529-2110 <http://www.univenture.com>

Univenture manufactures a complete line of alternative disc packaging products with patented Safety-sleeve(R) design. Utilizing proprietary high-speed production to manufacture sleeve products for CD, CD-ROM, CD-R, and DVD, Univenture provides stock and custom design solutions for single and multiple-disc applications and offers automated disc insertion technology and new Flexographic printing. Automated insertion saves time and labor by packaging discs during the sleeving process while our new printing process lets us customize your sleeves, with artwork that depicts your company image.

US DigitalMedia 21430 North 20th Avenue Phoenix, AZ 85027 877/992-3766 623/587-4900 Fax 602/294-6433 <http://www.usdigitalmedia.com>

US DigitalMedia provides manufacturer-direct CD replication, CD business cards, and custom CD shaping. It is an OEM supplier of AccuDisc CD-R media and the AccuPro line of CD autoloaders and towers. USDM is also a large-volume wholesaler of CD packaging supplies and a national OEM distributor for Affex, Kodak, Primera, and others.

Vaire, LLC 200-34 East 2nd Street Huntington Station, NY 11746 631/271-4933 Fax 631/424-1128 <http://www.vaire.com>

Manufacturers of CD business cards, Vaire can supply cut CD-ROMs, CD-Recordables, and DVD business cards in any shape the client prefers. These new cards are on the cutting edge of new promotional campaigns being used for branding, product descriptions, catalogs, annual reports, and trading cards. Vaire also offers content development, specializing in

multimedia and video presentations. Vaire services replicators, duplicators, ad agencies, and development services. Vaire can supply CD cards from start to finish.

VBrick Systems, Inc. 12 Beaumont Road Wallingford, CT 06492
203/265-0044 Fax 203/265-6750 <http://www.vbrick.com>

VBrick manufactures and markets low-cost MPEG-1 and -2-based encoders and decoders for video conferencing, streaming, distance learning, video authoring, telemedicine, training, and surveillance applications. It provides full-motion, 30fps (NTSC)/25fps (PAL) TV-quality video and CD-quality audio over Ethernet/ IP, ATM, T1/ E1, DS3, or wireless networks. Video and audio can be viewed on standard TV monitors or on any network-attached PC. VBrick also markets software for capturing, multicasting, and scheduling multimedia events on PCs.

Verbatim Corporation 1200 W.T. Harris Boulevard Charlotte, NC 28262
800/421-4188, 704/547-6500 Fax 704/547-6609 <http://www.verbatim.com>

Since its beginning in 1969, Verbatim has been at the forefront of the evolution in data storage technology. Today, Verbatim remains the technological leader in data storage and one of the most recognizable brand names in the industry. A subsidiary of Mitsubishi Chemical Corporation, Verbatim manufactures some of the industry's most advanced optical and tape media, including a full DVD line, 16X CD-R, and high-speed CD-RW discs.

Veriad 650 Columbia Street Brea, CA, 92821 800/423-4643 714/990-2700
Fax 800/962-0658 <http://www.veriad.com>

Veriad is a leading supplier of the finest quality of blank labeled sheets, tape management labels, packaging, software, and security products. Formats include CD, DVD, VHS, Betacam, U-Matic, DV, DVC, Minidisc, Audio Cassette, DVCAM, DVCPRO, Hi8, Zip, Jaz, DAT, Optical Disc, D1/D2, 35mm slides, Reel & Box, inkjet, and floppy disk, with inkjet, laser, and pin-feed options. We have pre-printed status, tamper-evident, barcode, and consecutive-numbering labels, and self-laminating and vinyl labels. Customized labeling available.

VERITAS Software 400 International Parkway Heathrow, FL 32746
407/531-7360 Fax 407/531-7670 <http://www.veritas.com>

As the leading provider of enterprise-class application storage management software, VERITAS ensures the continuous availability of business-critical information by delivering integrated, cross-platform management software solutions. VERITAS Software offers a complete range of leading, enterprise-class application storage management software solutions through a worldwide direct sales force and a global network of resellers and OEM partners. VERITAS Software's application storage management solutions meet the increasing demand to protect, access, and manage business-critical information.

Verity Systems 6236-A Main Street El Dorado, CA 9552 800/642-5151
530/525-9363 Fax 530/626-9395 <http://www.veritysystems.com>

Verity Systems specializes in management equipment for CD duplication, printing, and packaging. Products include the CopyDisc Series, which incorporates a range of Automatic Robotic Duplicators, available with 4, 8, and 16 writers as stand-alone or networkable units. Also included is the CopyDisc 7P, which is a seven-writer unit with thermal printer for integrated printing and duplicating. Verity Systems provides a wide range of products to offer complete solutions for all CD duplicating, printing, and packaging requirements.

Videotronic North America L.L.C. 3926 Varsity Drive Ann Arbor, MI 48108 734/668-9515 877/767-8862 <http://www.vtna.com>

Videotronic North America supplies professional audiovisual equipment solutions for your commercial kiosk, training, or other industrial applications. Videotronic is the exclusive worldwide source of all Philips ProDVD players and accessories, as well as our own line of solid-state **digital** video players.

Visible Light 195 W. State Road 434 Winter Springs, FL 32708
800/596-4494, 407/327-5700 Fax 407/327-5006 <http://www.visiblelight.com>

Visible Light is a developer and distributor of MPEG software and

hardware and a provider of online information about MPEG and DVD. Its OnStage line is the most extensive set of development tools for MPEG playback from CD-ROM, DVD-ROM, and HDD. With OnStage, you can quickly automate playback without authoring, yet integrate playback into most authoring languages for maximum flexibility. Sister company Visible Light **Digital** provides a full range of **digital** video post-production services, including DVD, VideoCD, OnStageCD, and OnStageDVD.

Visionworks Post 10 East 33rd Street New York, NY 10016 212/696-5312 212/696-5377 Fax 212/696-5513 <http://www.visionworkspost.com>

Visionworks Post is a full-service solution for DVD authoring, design, packaging, and replication. We have the finest designers, editors, and programmers, as well as state-of-the-art DVD equipment in our brand new facility located in the heart of Manhattan. Our award-winning designs and interactive programming have put us on top of the new DVD frontier. Visionworks has in-house **digital** post-production suites to assist in your projects from the ground up. Our complete packaging and replication services are fast and very competitive.

VITEC MULTIMEDIA 556 Weddell Drive Sunnyvale, CA 94089 408/752-8483 Fax 408/752-8486 <http://www.vitecmm.com>

VITEC is one of the oldest companies in the MPEG field. Its DCM (DVD Cut Machine), converts video film to DVD-Video format on a home PC and includes DVD tools for real-time encoding, authoring, and editing for MPEG-1/2, including VideoCD and DVD-compliant video. MPEGProfiler is a PCI encoding card (Windows NT) and VIDEO Clip MPEG-2 PRO software, creating value for comprehensive MPEG compression and editing. The plug-and-play card features YUV inputs and VTR control for only \$2995!

Wagar Associates, Inc. 69 Brunswick Avenue Extension Moosup, CT 06354 800/883-3472 860/564-1124 Fax 860/564-5654 <http://www.wagarassoc.com>

Wagar Associates, Inc. is a wholesale distributor of packaging and storage products for the music and software industries. We carry a complete line of CD boxes, including: Lids, Tints, Slims, Ultra Slims, 2-6 Multi-Packs, Calendars, DVD Boxes, Zip Cases, Mini CD Boxes, MD Cases, Fat Boxes, Sleeves, Trays, and Spiders. We also carry a complete line of "Retail Ready" storage products for CD, CD-ROM, and DVD. We are also pleased to introduce the "One Touch Series" for storage of CDs, DVDs, etc.

Warner Music Manufacturing Europe Max-Planck-Str. 1-9 Alsdorf NRW 52477 Germany +49 2404 58 444, +49 2404 58 392 Fax +49 2404 58 203 <http://www.wmme.de>

One of the world's largest DVD and CD replication outfits, including print components and packaging. DVD authoring, mastering, and printing plant in-house. Worldwide logistics.

WEA Advanced Media Operations (WAMO) 375 Hudson Street New York, NY 10014 212/741-1404 Fax 212/929-5365 <http://www.ivyhill-wms.com>

A founding member of the DVD consortium (now the DVD Forum), WAMO pioneered and perfected today's DVD standards. With more than 10,000 titles to its credit, WAMO's state-of-the-art facilities provide the tools and technologies to accomplish every task necessary to convert movie titles to DVD, including menu graphics, animation design, subtitle formatting, video compression, audio editing and encoding, authoring, compatibility testing, and more. Consistent attention to quality and performance has led to WAMO's maintaining the U.S. DVD Verification Lab on-site.

Williams Advanced Materials/Pure Tech 2978 Main Street Buffalo, NY 14214 716/837-1000; Fax 716/833-2926 <http://www.williams-adv.com>

Williams Advanced Materials and its subsidiary Pure Tech offer a wide array of solutions for CD-RW, CD-R, DVD, and MR/GMR applications. Products include sputtering targets, backing plates, mastering materials, refine/recycling, analytical services, material tracking, and customer support.

Winnercomm 6120 South Yale Tulsa, OK 74136 918/488-6921, 918/496-1900 Fax 918/499-5420 <http://www.winnercomm.com>

Winnercomm, Inc., founded in 1980, has evolved into one of the

largest television programming and production companies in the U.S. Today, with more than a dozen series in production, Winnercomm is among the largest independent packagers of programming in the country for the ESPN networks. Winnercomm offers a variety of turnkey services ranging from video production to broadcast design and interactive media, including DVD authoring and development, CD-ROM, Internet design and development, and full-service design capabilities, including print and packaging.

XIOTech Corporation 6455 Flying Cloud Drive Eden Prairie, MN 55344
612/828-5980 Fax 612/828-5990 <http://www.xiotech.com>

XIOTech Corporation, a wholly-owned subsidiary of Seagate, designs, manufactures, and markets integrated Storage Area Network (SAN) solutions. The XIOTech MAGNITUDE SAN is based on XIOTech's exclusive Real-Time Data Intelligence (REDI) Storage Architecture, the first in the industry to implement storage virtualization. The MAGNITUDE, along with a comprehensive suite of application-specific storage software, the REDI Software Family, makes storing, managing, safeguarding, and retrieving data on heterogeneous computing platforms easy and cost-effective.

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In the short time since Part 1 of this series appeared ONLINE, July/August 2000), the electronic book (ebook) business has continued developing at a torrid pace. Part 1 presented a general overview and definition of ebooks, and described the various types of ebook products, their underlying technologies, and current work towards developing ebook standards. This article concludes our examination of ebooks by focusing on the marketplace, discussing the major players in the industry, and describing some significant market events that have occurred recently. It is noteworthy that many of the online bookstores like Amazon.com have begun to include ebooks in their offerings. However, they are generally not producers of ebooks, just distributors, so they are not covered in this article.

It is important here to first acknowledge the contribution to the subject of ebooks by Stephanie Ardito, whose review appeared in the April 2000 issue of Searcher. The fact that the two leading journals in the field of information science, ONLINE and Searcher, saw fit to devote significant space to ebooks, is clear evidence of their rapidly growing importance.

THE EBOOK MARKETPLACE

Because the ebook marketplace is in its infancy, estimates of its size vary widely and range up to 35,000 titles. (The majority of the titles available as ebooks are romances (1).) Microsoft has estimated that ebooks will generate more than \$1 billion in annual revenues within three years. However, many ebooks currently sell in the \$3 to \$7 range, so this estimate seems unrealistically high. Judging from the number and size of organizations that are beginning to produce and sell ebooks or make alliances with ebook publishers, there seems to be a perception that the business has potential and is worth entering. In researching this article, it was also striking to notice how many players are jumping on the ebook bandwagon, even though few, if any, ventures are profitable yet, and little corresponding groundswell of demand from consumers has appeared.

A major key to success for ebook producers is how much value they can add to the publishing process and, especially, the reading experiences. In Part 1, the advantages and drawbacks of ebooks were discussed. As with full-text online databases, simply repurposing content to make it available on an ebook server will not guarantee a successful product. Publishers must add value and incorporate some of the unique advantages of ebooks in their products, or they will not succeed in the market. Adding value is especially difficult for novels that are generally read linearly; hyperlinks and searching capabilities, for example, are hardly needed.

It is also necessary to distinguish between ebook content and the appliances used to read them (2). This is difficult because in the eyes of many users, the device is the ebook. Once ebook readers reach a steady state in their development evolution, it will likely be that the greatest profit potential for ebooks lies in selling the content rather than the reading devices--the "Gillette razor" approach to the market. We may see

device reader manufacturers becoming subsidiaries of major ebook publishers.

MARKETPLACE PLAYERS

Companies in the ebook market include hardware developers producing ebook readers, Web site developers and maintainers who create downloadable ebook files, traditional book publishers who have begun to make some of their content available electronically, and special publishers whose entire business consists of ebooks. (The marketplace is moving so rapidly that any list of players quickly becomes outdated. Cost and **other data** in this article were correct as of mid-April 2000.) Contact data, URLs, and products for many of the players are listed in the table. Note that one seemingly obvious ebook URL, <http://www.e-books.com>, does not directly access any ebooks. It is simply a gateway to Amazon.com.

HARDWARE DEVELOPERS

NuovoMedia, Inc.

NuovoMedia produces the Rocket eBook reader, which is the leader in the dedicated ebook market. Recently, it and its leading competitor in the dedicated ebook reader market (SoftBook Press) were acquired by Gemstar International, the publisher of TV Guide and owner of several other entertainment services. One wonders why a media company would enter the ebook business: one "official" reason is to become a major source for dedicated ebook readers. (This strategy may eventually be thwarted by the Microsoft initiative described in Part 1, however.)

The Rocket reader is a handheld device measuring approximately 5" x 7.5" and weighing 22 ounces. It comes with 4MB of memory, which will hold about 4,000 pages of text (approximately 10 paperback novels). A 32MB upgrade is available. The reader contains a browser that automatically connects to the Rocket Web site and downloads titles. It runs on an internal battery providing over 20 hours of service. The user can choose the type size of the text, annotate or highlight passages of interest, and even switch to an audio mode and have the book read. The look and feel of the reader can also be customized by accessing a menu and changing to a different "skin". The Rocket reader contains software to convert any document or HTML file to its internal software format, thus allowing users to store their own documents or self-publish them. NuovoMedia has partnered with Barnes & Noble to sell the Rocket reader (but don't rush out to your nearest Barnes & Noble store without calling first; only a few of them carry it, and some employees in the stores that do not carry it have not heard of it).

Rocket has over 3,000 titles available for its reader, which costs \$199. (The upgraded version, with an additional 28MB of memory, costs \$269. The additional memory is thus priced at \$2.50/MB, which is similar to the typical \$2.80/MB cost of additional memory for a PC.) Rocket offers a unique PC-based simulation of its reader that can be downloaded from its Web site. The simulation works very well and provides an excellent introduction to the features and capabilities of dedicated ebook readers without the need to buy one. It also includes a useful tutorial article entitled "All About E-Books" that gives an extensive and excellent overview of the subject, as well as a copy of Alice in Wonderland (a favorite free title in many ebook collections). Interestingly, reviews of devices from other manufacturers that compete with the Rocket eBook reader also appear in this overview article. The article also claims that ebooks are cheaper than printed books, but one author found that Amazon.com was selling printed editions of some books for about half the price of the electronic edition. According to the list of the Rocket's features on the Rocket Web page, ebooks can be downloaded to the user's PC. Actually, the Rocket reader prohibits this because of copyright considerations.

Besides ebooks, Rocket offers access to an "electronic newsstand" which, as of this writing, contained 11 titles to which users could subscribe, then downloaded to the Rocket reader. The periodicals on the newsstand are generally focused on business or computing subjects, and include traditional newspapers such as the New York Times (certain sections

only) and the Wall Street Journal, but also electronic-only publications like Salon.com and TheStreet.com. Subscription prices range from free for some of the electronic publications (they can also be obtained free on the Web) to \$100/year for the newsletter Linux Gram.

SoftBook Press

The SoftBook Reader is the major competitor to the Rocket reader (although now that they are owned by the same parent company, they can hardly be considered competitors any longer). Despite its slightly greater weight and higher cost, the SoftBook Reader seems to be preferred by its users over the Rocket reader. It attempts to mimic the look and feel of a printed book with a protective leather cover that opens to reveal the 6" x 8" screen. It has 8MB of memory, which can be expanded to store up to 50,000 pages of content. Its built-in 33.6KB modem can download approximately 100 pages per minute directly from the dedicated server in the "SoftBookstore", so users do not need Internet access to obtain content.

Each SoftBook customer is given a personal "online bookshelf" that stores the titles they have selected for downloading. From the online bookshelf, users can download selected titles as often as desired. The SoftBook Reader is designed to work seamlessly with the Internet; users can not only download material from SoftBook's collection of titles contained in the SoftBookstore, but they can publish their own documents and download them to their reader. The SoftBookstore contains approximately 125 titles that can be downloaded free. In addition, in common with Rocket, it offers an updating service through an "electronic newsstand".

From Softbook's newsstand, users can download recent issues of major newspapers, such as the Wall Street Journal and New York Times, or popular periodicals such as Time, Fortune, PC Magazine, and Money. (Unfortunately, these periodicals can only be downloaded in text-only format, so the photographs are lost.) If the user leaves the reader plugged into a phone line, the modem will automatically connect with SoftBook's database at a specified time and download updates automatically. So far, 14 titles are available for this service. Now that Softbook and Rocket have a common corporate parent, it would not be surprising to see the two electronic newsstands merged, with a common title list.

The Softbook Reader is available directly from the manufacturer for \$600; a discounted price of \$300 is available to users who agree to spend at least \$19.95 monthly for 24 months at the SoftBookstore.

Everybook, Inc.

Everybook's reader, to be launched in mid-2000, is unique. Instead of a single screen, it features two 10.4" screens side by side. The screens can be used in tandem to mimic an open book, or they can be used independently of one another, with one screen portraying the ebook **content** and the **other** used for writing notes using a stylus or perhaps **linked** to a **reference** book such as a dictionary or thesaurus. The Everybook reader screens will be the first on the market to offer color. They will use active matrix technology and have a resolution of 1024 x 768 pixels, similar to the screens in top-market PCs or laptops. As with today's readers, there will be no keyboard, but the screen will have touch capability, so users can simply touch icons to issue commands. (An on-screen keyboard for use with the stylus will also be available.) The reader will contain a 233 MHz Pentium processor running the Linux operating system, a modem to access the Everybook Store and download titles, a removable card to increase its storage capacity, and audio and video capability.

Everybook has paid attention to research on people's reading behavior. (Links to some of this research are available on Everybook's Web site; click on "Read More Studies" on the home page.) Everybook's developers have noted that every language and culture uses the same two-page format for books and has done so for several centuries. Human-factors studies research has shown that this format is the most comfortable for users; a study by Stanley Wearden compared preferences for

reading in portrait (vertical like a book) or landscape (rotated 90 degrees) page layout and found that most people strongly prefer portrait orientation (3). Another study, by Kenton O'Hara and Abigail Sellen at Xerox, measured subjects' preferences for reading text online versus in print (4). Their study participants were presented with a passage to read and were asked to write a summary of it. Those reading on paper wrote their summaries on paper, and those reading online used a word processor to write their summaries. Not surprisingly, the results showed that, although online reading had some advantages, print was strongly preferred.

Rather than rushing a product to market and then being forced to correct its drawbacks, Everybook decided to carefully develop its marketing strategy using the results of its research. It recognized the reluctance of people to read from screens, the difficulty of forcing change on a long-established practice, and the staying power of printed books. Its philosophy has therefore been to create an extension of the book and the reading experience. In the company's view, there are three types of reading:

- * Reading to know, such as to find facts
- * Reading to learn from manuals or textbooks
- * Reading to experience a story

The design of the Everybook reader shows the influence of this model. Books are received from the publishers and downloaded into the reader in PDF format. This retains the layout, including the fonts, illustrations, and white space--features of books that make them powerful and effective knowledge-transfer devices. (Novels and similar types of literature are not as dependent on layout considerations and rarely need search engines, which may explain why the ebook market for them has not grown as rapidly as originally forecast.)

Everybook's market strategy has also been influenced by past research on books and how they are used. With an expected price of nearly \$2,000, the Everybook reader is not aimed at the consumer marketplace. Instead, Everybook's initial target markets are the professionals in business and technical areas who need access to a wide variety of textbooks, reference works, manuals, and similar types of publications. Customers will receive discounts from 25% to 40% off publishers' list prices, which will help them amortize the investment in their readers. Because it is using the PDF format, which is a de facto standard in many segments of the book publishing industry, Everybook is also able to offer publishers an attractive and minimal-cost entry into the ebook market. It will be interesting to watch the launch of Everybook's twin-screen reader and see how the market reacts to it.

DOWNLOADABLE EBOOK DATABASES

This section discusses some of the major players who have compiled collections of ebooks for downloading to the user's PC. Not all are mentioned here; see the table for further details.

Glassbook, Inc.

Glassbook delivers ebook reading software to users' PCs and offers a collection of ebooks for sale from its Web site (or from some online bookstores). The software is available free from the Glassbook Web site. However, because the files are large (6.9MB for the free standard version, 22MB for an enhanced version) downloading times are quite lengthy for users with a dialup connection to the Internet. (The large file sizes will be a significant disadvantage for many users, and are the reason I did not try out the Glassbook system. Fortunately, now that PCs routinely come with large hard disks, storage considerations for such large files are no longer the issue that they were in the past.) The enhanced version of the Glassbook reader contains an ebook version of the American Heritage Dictionary as well as additional functionality, and costs \$39 (which is currently being waived during a trial period).

According to the Glassbook Web site, the software integrates the entire process of buying, organizing, and reading ebooks. It has three modules: a bookstore for viewing basic information about the available

ebooks and purchasing them; a library for organizing and storing purchased books; and a reader for viewing them. Because the Glassbook software resides on a PC, it can use the capabilities of the hardware and display the books in color. And because it conforms to the OEB standard and uses PDF files, a wide variety of ebooks can be read using the Glassbook system. A unique feature for laptop users is the ability to rotate the image 90 degrees and read the ebooks with the laptop held on its side thus using the entire screen area more effectively.

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Project Gutenberg

Project Gutenberg's creator, Michael Hart, claims to be the first to post a document in electronic text on a computer. In 1971, he envisioned that computers would be used more for information storage and retrieval than for numerical computation. So he typed the Declaration of Independence into a file, stored it on a computer at the University of Illinois, and then sent it to some of his colleagues over the networks. Since 1971, Hart has dedicated himself to promoting the dissemination of electronic text to as wide an audience as possible at as low a cost as possible (which in this case means free). Hart feels that the only viable format for ebooks is plain ASCII text because virtually any hardware or software can handle ASCII files. It also means that, to keep the costs down by eliminating royalty payments to authors, only works in the public domain are included in the Project Gutenberg collection. The goal is to complete a 10,000-title "Project Gutenberg Electronic Public Library" by 2001. (One wonders if his goal will be met--the latest list of Project Gutenberg titles has just over 3,000 entries on it.)

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Although most of the work is done by volunteers, Project Gutenberg suffers from a chronic shortage of funding, and appeals for support are continually made. An email newsletter is available to update readers on the progress of the project.

Project Gutenberg is but one example of efforts to collect works in the public domain and make them freely available on the Web. Two others of note are Bartleby.com and the impressive collection at the University of Virginia's etext collection (<http://etext.lib.virginia.edu>).

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Begun as a personal research project and a hobby in 1993, Bartleby.com has just undergone a complete redesign and relaunch. The site now sports a new user interface and a new and faster search engine. Bartleby.com is now an incorporated company. It provides free access to its collection and receives revenue through advertising and the sales of books via an ecommerce link to Amazon.com. Not surprisingly, because of its free access policy, the site enjoys high traffic, especially from students and public libraries.

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WEB SITE ACCESS Books24x7

Books24x7, formerly known as Modem Age Books, is a leading aggregator of high-value business and technical books from major publishers such as MIT Press, O'Reilly, Que, and John Wiley. Books24x7 is headed by Christopher Pooley, known to many readers of ONLINE from his former positions with SilverPlatter and Pro-CD. Books24x7 was launched in September 1999 with over 200 books from 10 publishers. Since then, it has been adding 40 to 50 books a month, and now has agreements with 15 publishers and almost 400 books available to their users. Over 1,000 books are **under license** and will be added to the site in time.

According to Pooley, Books24x7 is taking a somewhat different approach to the ebook market. It views the content as the "solution to a problem rather than simply a book that can be read electronically." The company is directly involved in the OEB standards efforts and is planning to expand its customer base into the library market and other vertical segments. Customers can search, browse, and view (but not download) the full contents of the books on the site and can bookmark and annotate frequently used books. Similar to Amazon.com, they can also read and contribute reviews of titles.

netLibrary

netLibrary has become one of the most active and ambitious players in the ebook market. It is a leading provider of ebooks on the Internet, and reports that its Web site is enjoying heavy use--about one million hits per week. Founded in August 1998, netLibrary launched its Web site in March 1999 with approximately 2,000 titles. Having moved into a new production

facility at the end of 1999, netLibrary now produces 100 ebooks per day. As of April 2000, it had 18,000 titles available from more than 130 publishers. It has formed relationships with an impressive number of publishers, technology providers, and book distributors, as well as with many large libraries and library networks. netLibrary has raised in excess of \$100 million in strategic and venture financing. Investors include prominent companies in the publishing, book distribution, venture capital, and technology arenas.

It is interesting to note that netLibrary executives have stated that they do not expect many people to read books online in their entirety, but rather to use them as research sources. In this respect, netLibrary bears a strong resemblance to the online databases available through the traditional hosts long established in the information industry. In recent months, netLibrary has made moves into consumer ebooks, particularly with its recent acquisition of PeanutPress.com. netLibrary was also one of the vendors to provide Stephen King's ebook-only short story, *Riding the Bullet*.

netLibrary has developed a business model in which a library can purchase a number of "copies" (i.e., simultaneous accesses) of books and make them available to their users. Users can "check out" books and have exclusive electronic access to them until the checkout period expires. Participating libraries can thus offer 24-hour-a-day access to their collections without geographical restrictions. So, for example, a business traveler wishing to read a book could access his or her local library's netLibrary collection and "borrow" a book from anywhere in the world. Many of the library trials of ebooks currently underway involve netLibrary, and reports of these trials are beginning to appear in the literature (see "Ebooks in Libraries" in Part 1 of this article).

netLibrary's business model is that of a traditional print library, the only difference being that the books are stored on its server rather than on a bookshelf. (In response to this model, Anthony Ferguson remarked that using the netLibrary "seems to be taking an undesirable step back into history." (5)) netLibrary's philosophy of allowing only the number of simultaneous readers as subscriptions purchased has annoyed some library managers who have grown used to licensing access to one copy of an electronic database for use by their entire institution. Libraries in consortia, however, appreciate the idea of immediate access to books throughout the consortium without incurring the delays inherent in the interlibrary loan process, a service they had not been able to offer until the advent of ebooks. netLibrary has also pioneered the concept of a "perpetual access fee" to guarantee access to the ebooks purchased by a library even if the library's contract ends.

Titles are organized in collections according to subject; a "public collection" contains books available without charge from public domain sources, and the "private collection" contains copyrighted works available for a fee. Consumers wishing to use the private collection must either find a library offering netLibrary access and borrow the desired titles from it (assuming the library has obtained the title from netLibrary), or they can purchase individual titles from the netLibrary Web site. Because of the growing number of titles in the netLibrary collection, it has employed a staff of onsite library collection professionals to create specialized subject-oriented collections for its customers, thus freeing customers from the need to browse the entire 18,000-title collection. (Here is another example of alternative careers for information professionals in this Internet age.)

netLibrary will offer users a unique preview feature: the table of contents, index, and first 20 pages of a book will be available to assist in acquisition decisions. ("Purchasing" a book in the netLibrary environment means that the user can access it on netLibrary's Web site indefinitely without further charge.) Users, however, cannot download or print the entire contents of books. They remain on the Web site, and if a user tries to use Web browser capabilities to download or print excessive

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ibooks, a new entrant in the ebook business, recently raised \$4 million in venture capital. Founded in April 1999, ibooks now has 75 employees and expects to become a prime source for technical reference ebooks, mainly on computing and information technology subjects. ibooks has formed agreements with an impressive array of publishers, including O'Reilly, Que, Osborne Media Group, and John Wiley & Sons. Judging from its list of publishers with agreements pending, ibooks will soon expand into the legal, biomedical research, and clinical medicine areas. The ibooks server is physically located adjacent to a major Internet point of presence, which it claims is "the largest single piece of the Internet backbone in the world."

The ibooks platform is very similar to that of netLibrary, except that ibooks is targeting the single-user consumer market. Users purchase access to ebooks and download them to their "online bookshelf", which resides on the ibook server. When they wish to read a book, they must return to the ibooks site to access their online bookshelf, from which they can read their ebooks, download them to their computer, or print a single page at a time (they are prevented from printing the entire book or forwarding it to others). ibooks points out on its Web site that this strategy has advantages for the publishers because they can be provided with detailed and precise usage information. Because users must return frequently to the ibooks site, tailored advertisements can be presented to them based on their purchasing history. Thus, a relationship with the consumer can be built and nurtured. A feature of the ibooks service is the ability to conduct a full-text search of all of the books available through ibooks to find exactly the information desired and then preview the books before purchasing them.

MetaText, Inc.

MetaText's ebook service concentrates on college-level textbooks and reading lists which can be customized by the professor. Its most interesting feature is the ability to integrate tests into the ebook platform. Questions can be provided to the instructor by the publisher and made available to the students as desired. MetaText has built a testing platform that is more secure than conventional HTML-based tests. For example, students cannot view the source code for the test in an attempt to discover the answers, nor can they take tests multiple times. Time windows for testing can be established by the course instructor to control access to the tests.

In addition to the testing feature, the MetaText system also incorporates searching, annotation, book-marking, and other learning-oriented capabilities. Each student can establish a personal "home page" on the MetaText server, allowing them to receive course announcements and other communications from their instructor. Students can also establish an ecommerce "shopping cart", allowing them to purchase ebooks through the system. In common with other ebook platforms such as netLibrary and ibooks, publishers' copyrights are protected by restricting printing to single pages. MetaText is an interesting example of a special-purpose ebooks service, and we can expect to see other services dedicated to a particular market appear in the future.

SELF-PUBLISHERS

Generally, the products and services offered by the self-publishing vendors are fairly similar to one another. Most of them give authors space on their file server to disseminate their works; some provide help with graphic design, promotion, etc. They will also convert an author-supplied **file** to PDF or **other** appropriate format, and they provide a Web site so that readers can purchase the works. For these services, authors pay a nominal fee (\$500 or less is typical), and in return they receive royalties of 25% to 40% on sales.

Because the financial risk with self-publishing is largely borne by the author, the self-publishing companies do not attempt to guess whether the books will sell. They impose few restrictions on the material they will publish, although most of them prohibit content that is offensive, obscene, or promotes illegal activities. 1st Books (see next entry) reports that they decline approximately 9% of the manuscripts submitted to them. Several self-publishing companies have also noted that most of the authors they deal with publish for market exposure and recognition, not for financial gain (in fact, most authors never recover the investment they have made to create an ebook).

Many companies are getting into the self-publishing ebook business, and since so many of them offer similar services, they will not all be discussed in detail here. Most are, however, listed in the table. The two companies described here, 1st Books and Fatbrain, seem to be the largest and most aggressive ebook selfpublishers at the present time. Among the other self-publishing companies, two have features worthy of note: Spirit Virtual Books is owned by authors, and Xlibris will produce and sell hardcover versions of their self-published ebooks by producing a cover and binding the work.

1st Books

With over 3,000 ebooks available for downloading, 1st Books is one of the largest ebook purveyors and the largest self-publishing vendor. It was founded in 1996 when its CEO could not find a publisher for some children's books he had written.

1st Books maintains an extensive Web site listing its offerings, and is searchable by author, title, and subject. It obviously takes its mission in the ebook business seriously, as evidenced by the large amount of interesting and useful background information that not only promotes its products but also serves to educate would-be authors and others interested in ebooks. In common with several other Web sites along the same vein, the 1st Book site has very useful links to articles discussing ebooks, lists of ebook advantages, and quotes from users.

1st Books has been proactive in securing **rights** to digitize best-sellers. For example, when it noticed that stocks of some titles on the New York Times bestseller list were low in bookstores, it contacted the publishers and helped them convert the works to PDF format for sale through its Web site.

Fatbrain

In true Silicon Valley style, Fatbrain was founded in 1995 in a garage. It acquired Computer Literacy, a chain of 14 retail bookstores, in 1997 (and still operates two of them). The name of the online bookstore was changed to Fatbrain in 1999, and the eMatter division was established to serve the ebook market. Fatbrain has an interesting business model for its eMatter service. Authors set their own prices for their works, retain the copyright and distribution **rights**, receive a royalty of 50% of each sale, and are free to remove their works from the service whenever they wish. Fatbrain charges authors a \$1-per-month hosting fee for as long as their works remain on the site. In common with several other self-publishers, some Fatbrain works are available through other online bookstores such as Amazon.com.

Fatbrain is becoming known to information professionals because it has exhibited at several recent online conferences. According to material on its Web site, Fatbrain was recently named the second fastest growing

public company in Silicon Valley. Besides its fairly conventional self-publishing program, it also builds customized intranet-based "bookstores" for corporations.

SYSTEMS INTEGRATORS

Searchlight E-Book Training

Searchlight appears to be the first (and so far only) systems integrator in the ebook market. It offers a complete turnkey solution, from needs assessment, development, and conversion of content into ebook format to installation on readers or a Web site. According to Searchlight's Web site, it costs \$10,000 to develop one hour of computer-based training for delivery on PC or CD-ROM. Thus, conventional publishers tend to update course materials only infrequently. Searchlight claims that the technology of ebooks, which makes updating and delivery easy, can reduce these costs significantly, providing companies with an incentive to develop new materials or keep older ones up-to-date.

The Searchlight **Digital** Learning System uses ebook technology to develop complete corporate training courses including in-house manuals and handbooks, as well as information licensed from databases or other material. Users of this system can even connect dedicated readers (typically those sold by Rocket or SoftBook) via modem to company databases to download new or updated information.

SIGNIFICANT MARKETPLACE EVENTS

As noted earlier, the ebook marketplace is currently very active. Companies are entering and leaving frequently. Large companies such as Microsoft, Adobe, and Xerox have announced their intention to enter it. As noted in Part 1, this level of activity is reminiscent of the online retrieval industry shortly after its public launch in the 1970s. Here are a few of the more significant recent events:

- * Major publishers are beginning to test the market for ebooks. Simon & Schuster plans to allow users to download chapters of best-selling books in exchange for donations to charity. It is also preparing to digitize about 20% of its backlist. Bertelsmann, the parent of Random House, plans to work with Xerox to develop a print-on-demand operation for books. And Random House has begun a two-year project to digitize its entire backlist of 20,000 titles.

- * In addition to developing reader software, Microsoft has formed partnerships with major publishers to help them digitize their content and offer it as part of its ebook initiative. Publishers include R. R. Donnelley & Sons, Penguin Books, Simon & Schuster, and Time Warner.

- * Microsoft has formed a partnership with Barnes & Noble (barnesandnoble.com), which will create an ebook "superstore" to market ebook offerings that use the Microsoft Reader software.

- * The acquisition of Softbook and Rocket by Gemstar may signal that a shakeout in the industry is at hand. The acquisition will also provide needed financial resources allowing Softbook and Rocket to launch marketing campaigns attempting to stimulate consumer demand. In the article "Jump-Starting Electronic Books", Robin Peek comments that with this acquisition, coupled with the Microsoft/Barnes & Noble partnership, we may be witnessing "a defining moment in the future of the publishing industry" and the "dawning of the ebook age" (7).

- * netLibrary acquired PeanutPress, a producer of ebooks for handheld devices. This is a departure for netLibrary, which had not been in the reader segment of the ebook market. It gives it an entry into the consumer market in addition to the library markets it had previously targeted.

- * Searchlight E-book Training is conducting an interesting trial in a fourth-grade class at Resurrection Catholic School in Dayton, Ohio. Each student was given a Rocket ebook reader containing electronic versions of all their textbooks. Additional or updated information (from public domain information only) can be added to the students' readers from the teacher's. (This must be done one by one for each student, but a method of updating several student readers simultaneously may be developed if the trial shows that ebooks are a viable way of teaching students and if publishers agree

to supply new material electronically via subscriptions to schools.)

* The Adobe PDF Merchant software (described in detail in Part 1) has been released. The system is priced at \$5,000 plus a transaction fee. In addition, Adobe has also developed CoolType which appears to be similar to Microsoft's ClearType, improving the resolution and readability of the LCD displays used in several ebook readers. Adobe has also formed partnerships with several of the major ebook vendors; among the most notable is the integration of Glassbook's reader technology into Adobe's Acrobat reader, which is one of the most widely used technologies for reading documents available on the Internet.

* Some academic libraries have begun adding ebook records to their OPACs (a recent article by Terry Ballard describes how this was done, and also notes that he has created a page on his library's Web site, <http://invictus.quinnipac.edu/etexts.html>), to track new developments in ebooks (8)), and also add to their reserve book collections.

CONCLUSION

The ebook market is in a state of extreme flux and is changing daily. The accompanying table lists most of the major players as of this writing, but it will certainly become obsolete quickly. Commercial services catering to specialized markets are being developed. The library market is especially active and is being fueled by the prominence of netLibrary. A quote by Dennis Dillon of the University of Texas is significant: "The speed with which libraries are signing up with netLibrary speaks to the value libraries see in ebooks" (9). This statement could be applied to other market segments as well. The ebook industry shows great promise and will be an interesting segment of electronic information to observe as it develops and matures.

Donald T. Hawkins (D.T.Hawkins@att.net) is Editor-In-Chief of Information Science Abstracts and Fulltext Sources Online. He is a longtime contributor to the online information literature and a frequent speaker at industry conferences.

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FOR FURTHER READING

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Hawkins, Donald T. "Electronic Books: A Major Publishing Revolution. Part 1." ONLINE, Vol. 24, No. 4, July/August 2000, pp. 14-28.

Publisher Name: Online, Inc.

Company Names: *Amazon.com Inc.

Event Names: *600 (Market information - general)

Geographic Names: *1USA (United States)

Product Names: *4811520 (Online Services)

Industry Names: BUSN (Any type of business); LIB (Library and Information Science)

SIC Codes: 4822 (Telegraph & other communications)

NAICS Codes: 514191 (On-Line Information Services)

Ticker Symbols: AMZN

Special Features: COMPANY

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Electronic books: A major publishing revolution--part 2: The marketplace

Hawkins, Donald T

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Abstract:

Judging from the number and size of organizations that are beginning to produce and sell ebooks or make alliances with ebook publishers, there seems to be a perception that the business has potential and is worth entering. Profiles of several hardware and content developers are presented.

?

Text:

in the short time since Part 1 of this series appeared (ONLINE, July/August 2000), the electronic book (ebook) business has continued developing at a torrid pace. Part 1 presented a general overview and definition of ebooks, and described the various types of ebook products, their underlying technologies, and current work towards developing ebook standards. This article concludes our examination of ebooks by focusing on the marketplace, discussing the major players in the industry, and describing some significant market events that have occurred recently. It is noteworthy that many of the online bookstores like Amazon.com have begun to include ebooks in their offerings. However, they are generally not producers of ebooks, just distributors, so they are not covered in this article.

It is important here to first acknowledge the contribution to the subject of ebooks by Stephanie Ardito, whose review appeared in the April 2000 issue of Searcher. The fact that the two leading journals in the field of information science, ONLINE and Searcher, saw fit to devote significant space to ebooks, is clear evidence of their rapidly growing importance.

THE EBOOK MARKETPLACE

Because the ebook marketplace is in its infancy, estimates of its size vary widely and range up to 35,000 titles. (The majority of the titles available as ebooks are romances [1].) Microsoft has estimated that ebooks will generate more than \$1 billion in annual revenues within three years. However, many ebooks currently sell in the \$3 to \$7 range, so this estimate seems unrealistically high. Judging from the number and size of organizations that are beginning to produce and sell ebooks or make alliances with ebook publishers, there seems to be a perception that the business has potential and is worth entering. In researching this article, it was also striking to notice how many players are jumping on the ebook bandwagon, even though few, if any, ventures are profitable yet, and little corresponding groundswell of demand from consumers has appeared.

A major key to success for ebook producers is how much value they can add to the publishing process and, especially, the reading experiences. In Part 1, the advantages and drawbacks of ebooks were discussed. As with full-text online databases, simply repurposing content to make it available on an ebook server will not guarantee a successful product. Publishers must add value and incorporate some of the unique advantages of ebooks in their products, or they will not succeed in the market. Adding value is especially difficult for novels that are generally read linearly; hyperlinks and searching capabilities, for example, are hardly needed.

It is also necessary to distinguish between ebook content and the appliances used to read them [2]. This is difficult because in the eyes of many users, the device is the ebook. Once ebook readers reach a steady state in their development evolution, it will likely be that the greatest profit potential for ebooks lies in selling the content rather than the reading devices—the "Gillette razor" approach to the market. We may see device reader manufacturers becoming subsidiaries of major ebook publishers.

MARKETPLACE PLAYERS

Companies in the ebook market include hardware developers producing ebook readers, Web site developers and maintainers who create downloadable ebook files, traditional book publishers who have begun to make some of their content available electronically, and special publishers whose entire business consists of ebooks. (The marketplace is moving so rapidly that any list of players quickly becomes outdated. Cost and **other data** in this article were correct as of mid-April 2000.) Contact data, URLs, and products for many of the players are listed in the table. Note that one seemingly obvious ebook URL, <http://www.e-books.com>, does not directly access any ebooks. It is simply a gateway to Amazon.com.

HARDWARE DEVELOPERS

NuovoMedia, Inc.

NuovoMedia produces the Rocket eBook reader, which is the leader in the dedicated ebook market. Recently, it and its leading competitor in the dedicated ebook reader market (SoftBook Press) were acquired by Gemstar International, the publisher of TV Guide and owner of several other entertainment services. One wonders why a media company would enter the

ebook business: one "official" reason is to become a major source for dedicated ebook readers. (This strategy may eventually be thwarted by the Microsoft initiative described in Part 1, however.)

The Rocket reader is a handheld device measuring approximately 5" x 7.5" and weighing 22 ounces. It comes with 4MB of memory, which will hold about 4,000 pages of text (approximately 10 paperback novels). A 32MB upgrade is available. The reader contains a browser that automatically connects to the Rocket Web site and downloads titles. It runs on an internal battery providing over 20 hours of service. The user can choose the type size of the text, annotate or highlight passages of interest, and even switch to an audio mode and have the book read. The look and feel of the reader can also be customized by accessing a menu and changing to a different "skin". The Rocket reader contains software to convert any document or HTML file to its internal software format, thus allowing users to store their own documents or self publish them. NuovoMedia has partnered with Barnes & Noble to sell the Rocket reader (but don't rush out to your nearest Barnes & Noble store without calling first; only a few of them carry it, and some employees in the stores that do not carry it have not heard of it). Rocket has over 3,000 titles available for its reader, which costs \$199. (The upgraded version, with an additional 28MB of memory, costs \$269. The additional memory is thus priced at \$2.50/MB, which is similar to the typical \$2.80/MB cost of additional memory for a PC.) Rocket offers a unique PC-based simulation of its reader that can be downloaded from its Web site. The simulation works very well and provides an excellent introduction to the features and capabilities of dedicated ebook readers without the need to buy one. It also includes a useful tutorial article entitled "All About E-Books" that gives an extensive and excellent overview of the subject, as well as a copy of Alice in Wonderland (a favorite free title in many ebook collections). Interestingly, reviews of devices from other manufacturers that compete with the Rocket eBook reader also appear in this overview article. The article also claims that ebooks are cheaper than printed books, but one author found that Amazon.com was selling printed editions of some books for about half the price of the electronic edition. According to the list of the Rocket's features on the Rocket Web page, ebooks can be downloaded to the user's PC. Actually, the Rocket reader prohibits this because of copyright considerations.

The Rocket eBook reader

Ebook Market Players

Ebook Market Players

Besides ebooks, Rocket offers access to an "electronic newsstand" which, as of this writing, contained 11 titles to which users could subscribe, then downloaded to the Rocket reader. The periodicals on the newsstand are generally focused on business or computing subjects, and include traditional newspapers such as the New York Times (certain sections only) and the Wall Street Journal, but also electronic-- only publications like Salon.com and TheStreet.com. Subscription prices range from free for some of the electronic publications (they can also be obtained free on the Web) to \$100/year for the newsletter Linux Gram.

SoftBook Press

The SoftBook Reader is the major competitor to the Rocket reader (although now that they are owned by the same parent company, they can hardly be considered competitors any longer). Despite its slightly greater weight and higher cost, the SoftBook Reader seems to be preferred by its users over the Rocket reader. It attempts to mimic the look and feel of a printed book with a protective leather cover that opens to reveal the 6" x 8" screen. It

has 8MB of memory, which can be expanded to store up to 50,000 pages of content. Its built-in 33.6KB modem can download approximately 100 pages per minute directly from the dedicated server in the "SoftBookstore", so users do not need Internet access to obtain content.

Each SoftBook customer is given a personal "online bookshelf" that stores the titles they have selected for downloading. From the online bookshelf, users can download selected titles as often as desired. The SoftBook Reader is designed to work seamlessly with the Internet; users can not only download material from SoftBook's collection of titles contained in the SoftBookstore, but they can publish their own documents and download them to their reader. The SoftBookstore contains approximately 125 titles that can be downloaded free. In addition, in common with Rocket, it offers an updating service through an "electronic newsstand".

From Softbook's newsstand, users can download recent issues of major newspapers, such as the Wall Street Journal and New York Times, or popular periodicals such as Time, Fortune, PC Magazine, and Money. (Unfortunately, these periodicals can only be downloaded in text-only format, so the photographs are lost.) If the user leaves the reader plugged into a phone line, the modem will automatically connect with SoftBook's database at a specified time and download updates automatically. So far, 14 titles are available for this service. Now that Softbook and Rocket have a common corporate parent, it would not be surprising to see the two electronic newsstands merged, with a common title list.

The SoftBook Reader

Ebook Market Players

The Softbook Reader is available directly from the manufacturer for \$600; a discounted price of \$300 is available to users who agree to spend at least \$19.95 monthly for 24 months at the SoftBookstore. Everybook, Inc.

Everybook's reader, to be launched in mid-2000, is unique. Instead of a single screen, it features two 10.4" screens side by side. The screens can be used in tandem to mimic an open book, or they can be used independently of one another, with one screen portraying the ebook **content** and the **other** used for writing notes using a stylus or perhaps **linked** to a **reference** book such as a dictionary or thesaurus. The Everybook reader screens will be the first on the market to offer color. They will use active matrix technology and have a resolution of 1024 x 768 pixels, similar to the screens in top-market PCs or laptops. As with today's readers, there will be no keyboard, but the screen will have touch capability, so users can simply touch icons to issue commands. (An on-screen keyboard for use with the stylus will also be available.) The reader will contain a 233 MHz Pentium processor running the Linux operating system, a modem to access the Everybook Store and download titles, a removable card to increase its storage capacity, and audio and video capability.

Everybook has paid attention to research on people's reading behavior. (Links to some of this research are available on Everybook's Web site; click on "Read More Studies" on the home page.) Everybook's developers have noted that every language and culture uses the same two-page format for books and has done so for several centuries. Human-factors studies research has shown that this format is the most comfortable for users; a study by Stanley Wearden compared preferences for reading in portrait (vertical like a book) or landscape (rotated 90 degrees) page layout and found that most people strongly prefer portrait orientation [3]. Another study, by Kenton O'Hara and Abigail Sellen at Xerox, measured subjects' preferences for

reading text online versus in print [4]. Their study participants were presented with a passage to read and were asked to write a summary of it. Those reading on paper wrote their summaries on paper, and those reading online used a word processor to write their summaries. Not surprisingly, the results showed that, although online reading had some advantages, print was strongly preferred.

Rather than rushing a product to market and then being forced to correct its drawbacks, Everybook decided to carefully develop its marketing strategy using the results of its research. It recognized the reluctance of people to read from screens, the difficulty of forcing change on a longestablished practice, and the staying power of printed books. Its philosophy has therefore been to create an extension of the book and the reading experience. In the company's view, there are three types of reading:

Reading to know, such as to find facts

Reading to learn from manuals or textbooks

Reading to experience a story

The design of the Everybook reader shows the influence of this model. Books are received from the publishers and downloaded into the reader in PDF format. This retains the layout, including the fonts, illustrations, and white space-features of books that make them powerful and effective knowledge-transfer devices. (Novels and similar types of literature are not as dependent on layout considerations and rarely need search engines, which may explain why the ebook market for them has not grown as rapidly as originally forecast.)

Everybook's market strategy has also been influenced by past research on books and how they are used. With an expected price of nearly \$2,000, the Everybook reader is not aimed at the consumer marketplace. Instead, Everybook's initial target markets are the professionals in business and technical areas who need access to a wide variety of textbooks, reference works, manuals, and similar types of publications. Customers will receive discounts from 25% to 40% off publishers' list prices, which will help them amortize the investment in their readers. Because it is using the PDF format, which is a de facto standard in many segments of the book publishing industry, Everybook is also able to offer publishers an attractive and minimal-cost entry into the ebook market. It will be interesting to watch the launch of Everybook's twin-screen reader and see how the market reacts to it.

DOWNLOADABLE EBOOK DATABASES

This section discusses some of the major players who have compiled collections of ebooks for downloading to the user's PC. Not all are mentioned here; see the table for further details.

Glassbook, Inc.

The Everybook reader

Glassbook delivers ebook reading software to users' PCs and offers a collection of ebooks for sale from its Web site (or from some online bookstores). The software is available free from the Glassbook Web site. However, because the files are large (6.9MB for the free standard version, 22MB for an enhanced version) downloading times are quite lengthy for users with a dialup connection to the Internet. (The large file sizes will be a significant disadvantage for many users, and are the reason I did not try out the Glassbook system. Fortunately, now that PCs routinely come with large hard disks, storage considerations for such large files are no longer

the issue that they were in the past.) The enhanced version of the Glassbook reader contains an ebook version of the American Heritage Dictionary as well as additional functionality, and costs \$39 (which is currently being waived during a trial period). According to the Glassbook Web site, the software integrates the entire process of buying, organizing, and reading ebooks. It has three modules: a bookstore for viewing basic information about the available ebooks and purchasing them; a library for organizing and storing purchased books; and a reader for viewing them. Because the Glassbook software resides on a PC, it can use the capabilities of the hardware and display the books in color. And because it conforms to the OEB standard and uses PDF files, a wide variety of ebooks can be read using the Glassbook system. A unique feature for laptop users is the ability to rotate the image 90 degrees and read the ebooks with the laptop held on its side thus using the entire screen area more effectively.

The Glassbook reader is not yet available for the Macintosh platform. In common with many ebook producers, Glassbook offers a selection of titles for downloading to its readers at no charge. Glassbook also sells an ebook content server to publishers and booksellers, a library server, and an ebook kiosk for use as a standalone purchasing station in malls, airports, etc.

Librius.com, Inc.

Librius operates an ebookstore delivering titles for reading on handheld devices running the Palm Pilot and Windows CE operating systems (According to the Librius Web site, Windows 95/98/2000 software will be available soon). Books are also offered for sale via Librius' Books2Read.com Web site. When a book is purchased, it is listed in the user's "personal library" and can be downloaded repeatedly at will if, for example, the user buys a new reading device. Because the screens of handheld devices are so small, one wonders how successful Librius will be in the market. Reading a book on a Palm Pilot's screen would be an extremely difficult experience not only because of the small type but because of scrolling required to read an entire book.

Project Gutenberg

Project Gutenbergs creator, Michael Hart, claims to be the first to post a document in electronic text on a computer. In 1971, he envisioned that computers would be used more for information storage and retrieval than for numerical computation. So he typed the Declaration of Independence into a file, stored it on a computer at the University of Illinois, and then sent it to some of his colleagues over the networks. Since 1971, Hart has dedicated himself to promoting the dissemination of electronic text to as wide an audience as possible at as low a cost as possible (which in this case means free). Hart feels that the only viable format for ebooks is plain ASCII text because virtually any hardware or software can handle ASCII files. It also means that, to keep the costs down by eliminating royalty payments to authors, only works in the public domain are included in the Project Gutenberg collection. The goal is to complete a 10,000-title "Project Gutenberg Electronic Public Library" by 2001. (One wonders if this goal will be met-the latest list of Project Gutenberg titles has just over 3,000 entries on it.)

Project Gutenberg ebooks are scanned, converted to ASCII, and then stored and distributed as common ZIP files. The library contains three types of literature:

Light literature-Alice in Wonderland, Aesop's Fables, etc.

Heavy literature--the Bible, Shakespeare's plays, Moby Dick, etc.

Reference works--dictionaries, encyclopedias, Roget's Thesaurus, and almanacs

A complete list of the titles available can be downloaded from the Project Gutenberg Web site.

Although most of the work is done by volunteers, Project Gutenberg suffers from a chronic shortage of funding, and appeals for support are continually made. An email newsletter is available to update readers on the progress of the project.

Project Gutenberg is but one example of efforts to collect works in the public domain and make them freely available on the Web. Two others of note are Bartleby.com and the impressive collection at the University of Virginia's etext collection (<http://etext.lib.virginia.edu>).

eText Station

A new entrant into the ebook marketplace, eText Station produces specialized software to convert ASCII text ebooks like those available through Project Gutenberg into a format that enhances the reading experience of dedicated ebook readers or browsers. Although it is possible to download ASCII ebooks directly to readers, reading the resulting file is difficult and not very pleasant because the text does not wrap correctly on the reader screen. eText Station's product, the eText Explorer, converts such ebooks into HTML or the Open eBook Format which permits them to be formatted attractively on dedicated readers. Because one of the output formats is HTML, text formatted with eText Explorer can be easily read using any browser. The eText Explorer is a special application dedicated to Project Gutenberg books. A more general version, eText eXpress, applies the same technology to other ebook files and is currently under development.

The eText Web site contains a useful page with links to a number of ebook portals (click "10 Top Sites" under "Docks"). eText Station was formerly known as Gutenberg Station, but its name was recently changed to avoid confusion with Project Gutenberg or conflict with its trademark. Bartleby.com

Begun as a personal research project and a hobby in 1993, Bartleby.com has just undergone a complete redesign and relaunch. The site now sports a new user interface and a new and faster search engine. Bartleby.com is now an incorporated company. It provides free access to its collection and receives revenue through advertising and the sales of books via an ecommerce link to Amazon.com. Not surprisingly, because of its free access policy, the site enjoys high traffic, especially from students and public libraries.

Similar to Project Gutenberg, Bartleby.com provides users with access to a collection of literature in the public domain (such as over 19,000 quotations and 4,700 poems), but it has also added a number of reference works and is aggressively moving forward and implementing a major expansion plan. Among the reference works that have recently become available through Bartleby.com are the Columbia Encyclopedia, sixth edition (which is not yet in print), Roget's 11: The New Thesaurus, and Simpson's Quotations. Its entire collection is freely accessible and completely searchable. According to Steven van Leeuwen, publisher and founder, Bartleby.com has "the most comprehensive public reference library ever published on the Web"--a far-reaching and potentially controversial claim.

WEB SITE ACCESS

Books24x7

Books24x7, formerly known as Modern Age Books, is a leading aggregator of high-value business and technical books from major publishers such as MIT Press, O'Reilly, Que, and John Wiley. Books24x7 is headed by Christopher Pooley, known to many readers of ONLINE from his former positions with SilverPlatter and Pro-CD. Books24x7 was launched in September 1999 with over 200 books from 10 publishers. Since then, it has been adding 40 to 50 books a month, and now has agreements with 15 publishers and almost 400 books available to their users. Over 1,000 books are **under license** and will be added to the site in time.

According to Pooley, Books24x7 is taking a somewhat different approach to the ebook market. It views the content as the "solution to a problem rather than simply a book that can be read electronically." The company is directly involved in the OEB standards efforts and is planning to expand its customer base into the library market and other vertical segments. Customers can search, browse, and view (but not download) the full contents of the books on the site and can bookmark and annotate frequently used books. Similar to Amazon.com, they can also read and contribute reviews of titles.

netLibrary

netLibrary has become one of the most active and ambitious players in the ebook market. It is a leading provider of ebooks on the Internet, and reports that its Web site is enjoying heavy use-about one million hits per week. Founded in August 1998, netLibrary launched its Web site in March 1999 with approximately 2,000 titles. Having moved into a new production facility at the end of 1999, netLibrary now produces 100 ebooks per day. As of April 2000, it had 18,000 titles available from more than 130 publishers. It has formed relationships with an impressive number of publishers, technology providers, and book distributors, as well as with many large libraries and library networks. netLibrary has raised in excess of \$100 million in strategic and venture financing. Investors include prominent companies in the publishing, book distribution, venture capital, and technology arenas.

It is interesting to note that netLibrary executives have stated that they do not expect many people to read books online in their entirety, but rather to use them as research sources. In this respect, netLibrary bears a strong resemblance to the online databases available through the traditional hosts long established in the information industry. In recent months, netLibrary has made moves into consumer ebooks, particularly with its recent acquisition of PeanutPress.com. netLibrary was also one of the vendors to provide Stephen King's ebook-only short story, *Riding the Bullet*.

netLibrary has developed a business model in which a library can purchase a number of "copies" (i.e., simultaneous accesses) of books and make them available to their users. Users can "check out" books and have exclusive electronic access to them until the checkout period expires. Participating libraries can thus offer 24-hour-a-day access to their collections without geographical restrictions. So, for example, a business traveler wishing to read a book could access his or her local library's netLibrary collection and "borrow" a book from anywhere in the world. Many of the library trials of ebooks currently underway involve netLibrary, and reports of these trials are beginning to appear in the literature (see "Ebooks in Libraries" in Part 1 of this article).

netLibrary's business model is that of a traditional print library, the only difference being that the books are stored on its server rather than on a bookshelf. (In response to this model, Anthony Ferguson remarked that using the netLibrary "seems to be taking an undesirable step back into

history." [5]) netLibrary's philosophy of allowing only the number of simultaneous readers as subscriptions purchased has annoyed some library managers who have grown used to licensing access to one copy of an electronic database for use by their entire institution. Libraries in consortia, however, appreciate the idea of immediate access to books throughout the consortium without incurring the delays inherent in the interlibrary loan process, a service they had not been able to offer until the advent of ebooks. netLibrary has also pioneered the concept of a "perpetual access fee" to guarantee access to the ebooks purchased by a library even if the library's contract ends.

Titles are organized in collections according to subject; a "public collection" contains books available without charge from public domain sources, and the "private collection" contains copyrighted works available for a fee. Consumers wishing to use the private collection must either find a library offering netLibrary access and borrow the desired titles from it (assuming the library has obtained the title from netLibrary), or they can purchase individual titles from the netLibrary Web site. Because of the growing number of titles in the netLibrary collection, it has employed a staff of onsite library collection professionals to create specialized subject-oriented collections for its customers, thus freeing customers from the need to browse the entire 18,000title collection. (Here is another example of alternative careers for information professionals in this Internet age.)

netLibrary will offer users a unique preview feature: the table of contents, index, and first 20 pages of a book will be available to assist in acquisition decisions. ("Purchasing" a book in the netLibrary environment means that the user can access it on netLibrary's Web site indefinitely without further charge.) Users, however, cannot download or print the entire contents of books. They remain on the Web site, and if a user tries to use Web browser capabilities to download or print excessive amounts of content, he or she receives a warning and, ultimately, loses access to the site.

The netLibrary interface has incorporated several features to help users. The site can be browsed by collection, and the entire database, including the contents of the ebooks, is searchable. Tables of Contents contain hyperlinks to each chapter so users can jump directly to them. Because the entire database is full-text searchable, every word in an ebook is also a hyperlink. In addition to its Web browser interface, netLibrary is also able to download content to dedicated ebook readers. According to an article by Andrew Richard Albanese, netLibrary has been approached by some publishers wishing to license its software technology, so we can expect to see it moving into this area of the ebook business as well [6].

ibooks.com

ibooks, a new entrant in the ebook business, recently raised \$4 million in venture capital. Founded in April 1999, ibooks now has 75 employees and expects to become a prime source for technical reference ebooks, mainly on computing and information technology subjects. ibooks has formed agreements with an impressive array of publishers, including O'Reilly, flue, Osborne Media Group, and John Wiley & Sons. Judging from its list of publishers with agreements pending, ibooks will soon expand into the legal, biomedical research, and clinical medicine areas. The ibooks server is physically located adjacent to a major Internet point of presence, which it claims is "the largest single piece of the Internet backbone in the world."

netLibrary

The ibooks platform is very similar to that of netLibrary, except that

ibooks is targeting the single-user consumer market. Users purchase access to ebooks and download them to their "online bookshelf", which resides on the ibook server. When they wish to read a book, they must return to the ibooks site to access their online bookshelf, from which they can read their ebooks, download them to their computer, or print a single page at a time (they are prevented from printing the entire book or forwarding it to others). ibooks points out on its Web site that this strategy has advantages for the publishers because they can be provided with detailed and precise usage information. Because users must return frequently to the ibooks site, tailored advertisements can be presented to them based on their purchasing history. Thus, a relationship with the consumer can be built and nurtured. A feature of the ibooks service is the ability to conduct a full-text search of all of the books available through ibooks to find exactly the information desired and then preview the books before purchasing them.

MetaText, Inc.

MetaText's ebook service concentrates on college-level textbooks and reading lists which can be customized by the professor. Its most interesting feature is the ability to integrate tests into the ebook platform. Questions can be provided to the instructor by the publisher and made available to the students as desired. MetaText has built a testing platform that is more secure than conventional HTML-based tests. For example, students cannot view the source code for the test in an attempt to discover the answers, nor can they take tests multiple times. Time windows for testing can be established by the course instructor to control access to the tests.

In addition to the testing feature, the MetaText system also incorporates searching, annotation, bookmarking, and other learning-oriented capabilities. Each student can establish a personal "home page" on the MetaText server, allowing them to receive course announcements and other communications from their instructor. Students can also establish an ecommerce "shopping cart", allowing them to purchase ebooks through the system. In common with other ebook platforms such as netLibrary and ibooks, publishers' copyrights are protected by restricting printing to single pages. MetaText is an interesting example of a special-purpose ebooks service, and we can expect to see other services dedicated to a particular market appear in the future.

SELF-PUBLISHERS

Generally, the products and services offered by the self publishing vendors are fairly similar to one another. Most of them give authors space on their file server to disseminate their works; some provide help with graphic design, promotion, etc. They will also convert an author-- supplied **file** to PDF or **other** appropriate format, and they provide a Web site so that readers can purchase the works. For these services, authors pay a nominal fee (\$500 or less is typical), and in return they receive royalties of 25% to 40% on sales.

Because the financial risk with self publishing is largely borne by the author, the self publishing companies do not attempt to guess whether the books will sell. They impose few restrictions on the material they will publish, although most of them prohibit content that is offensive, obscene, or promotes illegal activities. 1st Books (see next entry) reports that they decline approximately 9% of the manuscripts submitted to them. Several self publishing companies have also noted that most of the authors they deal with publish for market exposure and recognition, not for financial gain (in fact, most authors never recover the investment they have made to create an ebook).

Many companies are getting into the self publishing ebook business, and

since so many of them offer similar services, they will not all be discussed in detail here. Most are, however, listed in the table. The two companies described here, 1st Books and Fatbrain, seem to be the largest and most aggressive ebook self publishers at the present time. Among the other self publishing companies, two have features worthy of note: Spirit Virtual Books is owned by authors, and Xlibris will produce and sell hardcover versions of their self published ebooks by producing a cover and binding the work.

1st Books

ibooks.com

With over 3,000 ebooks available for downloading, 1st Books is one of the largest ebook purveyors and the largest self publishing vendor. It was founded in 1996 when its CEO could not find a publisher for some children's books he had written.

1st Books maintains an extensive Web site listing its offerings, and is searchable by author, title, and subject. It obviously takes its mission in the ebook business seriously, as evidenced by the large amount of interesting and useful background information that not only promotes its products but also serves to educate would-be authors and others interested in ebooks. In common with several other Web sites along the same vein, the 1st Book site has very useful links to articles discussing ebooks, lists of ebook advantages, and quotes from users.

1st Books has been proactive in securing **rights** to digitize best-sellers. For example, when it noticed that stocks of some titles on the New York Times bestseller list were low in bookstores, it contacted the publishers and helped them convert the works to PDF format for sale through its Web site.

Fatbrain

In true Silicon Valley style, Fatbrain was founded in 1995 in a garage. It acquired Computer Literacy, a chain of 14 retail bookstores, in 1997 (and still operates two of them). The name of the online bookstore was changed to Fatbrain in 1999, and the eMatter division was established to serve the ebook market. Fatbrain has an interesting business model for its eMatter service. Authors set their own prices for their works, retain the copyright and distribution **rights**, receive a royalty of 50% of each sale, and are free to remove their works from the service whenever they wish. Fatbrain charges authors a \$1-per-month hosting fee for as long as their works remain on the site. In common with several other self publishers, some Fatbrain works are available through other online bookstores such as Amazon.com.

Fatbrain is becoming known to information professionals because it has exhibited at several recent online conferences. According to material on its Web site, Fatbrain was recently named the second fastest growing public company in Silicon Valley. Besides its fairly conventional self publishing program, it also builds customized intranetbased "bookstores" for corporations.

SYSTEMS INTEGRATORS

Searchlight E-Book Training

Searchlight appears to be the first (and so far only) systems integrator in the ebook market. It offers a complete turnkey solution, from needs assessment, development, and conversion of content into ebook format to installation on readers or a Web site. According to Searchlight's Web site,

it costs \$10,000 to develop one hour of computer-based training for delivery on PC or CD-ROM. Thus, conventional publishers tend to update course materials only infrequently. Searchlight claims that the technology of ebooks, which makes updating and delivery easy, can reduce these costs significantly, providing companies with an incentive to develop new materials or keep older ones up-to-date.

The Searchlight **Digital** Learning System uses ebook technology to develop complete corporate training courses including in-house manuals and handbooks, as well as information licensed from databases or other material. Users of this system can even connect dedicated readers (typically those sold by Rocket or SoftBook) via modem to company databases to download new or updated information.

SIGNIFICANT MARKETPLACE EVENTS

As noted earlier, the ebook marketplace is currently very active. Companies are entering and leaving frequently. Large companies such as Microsoft, Adobe, and Xerox have announced their intention to enter it. As noted in Part 1, this level of activity is reminiscent of the online retrieval industry shortly after its public launch in the 1970s. Here are a few of the more significant recent events:

Major publishers are beginning to test the market for ebooks. Simon & Schuster plans to allow users to download chapters of best-selling books in exchange for donations to charity. It is also preparing to digitize about 20% of its backlist. Bertelsmann, the parent of Random House, plans to work with Xerox to develop a print-on-demand operation for books. And Random House has begun a twoyear project to digitize its entire backlist of 20,000 titles.

In addition to developing reader software, Microsoft has formed partnerships with major publishers to help them digitize their content and offer it as part of its ebook initiative. Publishers include R. R. Donnelley & Sons, Penguin Books, Simon & Schuster, and Time Warner. Microsoft has formed a partnership with Barnes & Noble (barnesandnoble.com), which will create an ebook "superstore" to market ebook offerings that use the Microsoft Reader software.

The acquisition of Softbook and Rocket by Gemstar may signal that a shakeout in the industry is at hand. The acquisition will also provide needed financial resources allowing Softbook and Rocket to launch marketing campaigns attempting to stimulate consumer demand. In the article "JumpStarting Electronic Books", Robin Peek comments that with this acquisition, coupled with the Microsoft/Barnes & Noble partnership, we may be witnessing "a defining moment in the future of the publishing industry" and the "dawning of the ebook age" [7].

netLibrary acquired PeanutPress, a producer of ebooks for handheld devices. This is a departure for netLibrary, which had not been in the reader segment of the ebook market. It gives it an entry into the consumer market in addition to the library markets it had previously targeted.

Searchlight E-book Training is conducting an interesting trial in a fourth-grade class at Resurrection Catholic School in Dayton, Ohio. Each student was given a Rocket ebook reader containing electronic versions of all their textbooks. Additional or updated information (from public domain information only) can be added to the students' readers from the teacher's. (This must be done one by one for each student, but a method of updating several student readers simultaneously may be developed if the trial shows that ebooks are a viable way of teaching students and if publishers agree to supply new material electronically via subscriptions to schools.)

The Adobe PDF Merchant software (described in detail in Part 1) has been released. The system is priced at \$5,000 plus a transaction fee. In addition, Adobe has also developed CoolType which appears to be similar to Microsoft's ClearType, improving the resolution and readability of the LCD displays used in several ebook readers. Adobe has also formed partnerships with several of the major ebook vendors; among the most notable is the integration of Glassbook's reader technology into Adobe's Acrobat reader, which is one of the most widely used technologies for reading documents available on the Internet.

Some academic libraries have begun adding ebook records to their OPACs (a recent article by Terry Ballard describes how this was done, and also notes that he has created a page on his library's Web site, <http://invictus.quinnipac.edu/etexts.html>), to track new developments in ebooks [8]), and also add to their reserve book collections.

CONCLUSION

The ebook market is in a state of extreme flux and is changing daily. The accompanying table lists most of the major players as of this writing, but it will certainly become obsolete quickly. Commercial services catering to specialized markets are being developed. The library market is especially active and is being fueled by the prominence of netLibrary. A quote by Dennis Dillon of the University of Texas is significant: "The speed with which libraries are signing up with netLibrary speaks to the value libraries see in ebooks" [9]. This statement could be applied to other market segments as well. The ebook industry shows great promise and will be an interesting segment of electronic information to observe as it develops and matures.

FOR FURTHER READING

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THIS IS THE FULL-TEXT.

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Geographic Names: United States; US

Descriptors: E-books; Electronic publishing; Handheld computers; Web sites; Manycompanies; Market potential

Classification Codes: 5250 (CN=Telecommunications systems & Internet communications); 8690 (CN=Publishing industry); 9190 (CN=United States)

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13/9/19 (Item 19 from file: 16)

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Sun Microsystems Assembles Industry-Leading Partners in Its iForce(SM) Solution Set for Mobile Wireless Internet.

PR Newswire , p NA

June 6 , 2000

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Portfolio Cuts Through the Noise to Deliver the Best Solutions

For the Creation, Delivery and Management of Mobile Wireless
Portals and Services

ATLANTA, June 6 /PRNewswire/ --

Sun Microsystems, Inc. (Nasdaq: SUNW) today unveiled its iForce(SM) Solution Set for Mobile Wireless Internet. This growing portfolio, which

was defined by Sun and developed with solutions from Sun and 19 other important innovators that are shaping the mobile wireless industry, is designed to provide enterprises, content providers and service providers with a flexible and powerful infrastructure for deploying wireless-enabled portals and services. Through the iForce wireless solution set, customers are able to develop and deliver secure, personalized and localized information, communication, commerce and entertainment services to customers on a wide variety of wireless devices and platforms.

In addition, the iForce wireless solution set -- which includes solutions from Sun, 724 Solutions Inc.; Aether Systems, Inc.; AirFlash; Art Technology Group (ATG); BroadVision; Cambridge Positioning Systems; enCommerce; Entrust Technologies; Everypath, Inc.; Inktomi Corp.; iPlanet E-Commerce Solutions, a Sun-Netscape Alliance; Nokia; Peramon; Phone.com; Portal Software; Siebel Systems; SignalSoft; Spyglass and Vignette -- will be incorporated into Sun's iForce(SM) Ready Center, first in the Menlo Park, California, center. The iForce Ready Center will help Sun customers evaluate a wireless approach that best fits their business needs, which can help reduce application design and development time, reduce costs, and ensure faster time-to-market.

"Sun's vision for enabling a networked world is more true today than ever," said Doug Kaewert, vice president, Market Development at Sun Microsystems, Inc. "In pulling together the best of industry partner technologies for our iForce wireless solution set initiative, Sun is helping companies easily create their ideal, end-to-end mobile wireless infrastructure for delivery of content and services to their consumers anywhere and on any device."

With its wireless portfolio, Sun continues its leadership position in delivering the products, technologies, services, partnerships and programs which cater to the unique needs of the worldwide mobile market.

Maximum Flexibility, End-to-End

Since wireless application and services delivery requirements vary by customer and by industry, the iForce wireless solution set was designed to give customers maximum flexibility.

The solutions in this wireless portfolio are those that have earned Sun's recognition for excellence in their field. The iForce wireless solution set features mobile wireless solutions that are based on industry-leading and open standards and technologies such as eXtensible Markup Language (XML), Wireless Application Protocol (WAP) and Java(TM) technology, and address the key market segments that comprise an end-to-end wireless application infrastructure solution:

Platform, System and Enterprise Infrastructure -- Sun's proven Solaris(TM) Operating Environment and massively scalable enterprise and carrier-grade UltraSPARC(TM) platforms, combined with industry-leading enterprise and Web solutions, provide for the most robust, scalable and secure wireless Web application foundation.

Wireless Internet Servers and Gateways -- Wireless Internet servers and gateways bridge today's wireless voice communications networks with the Internet for the delivery of wireless content and data services onto **digital** mobile phones and other wireless terminals. Industry partner solutions that are part of the iForce wireless solution set include Nokia's WAP **Server**, Peramon's WAP Gateway and Phone.com's UP.

Link Server Suite.

Wireless Portal Infrastructure -- iPlanet(TM) Wireless **Server** solution provides a scalable, standards-based platform for delivering mobile data services, like messaging, calendaring and directory services, as well as a modular, extensible architecture for developing advanced, value-added services. To complement the iPlanet Wireless Server solution, the iPlanet(TM) Portal Server brings together online communities of connected users by providing personalized, more secure aggregation of content and seamless integration with back-end applications.

Wireless Content Publishing and Personalization -- ATG Dynamo,

BroadVision One-to-One and Vignette V/5 are leading solutions for commerce and content infrastructure and enable the personalization of wireless services and applications.

Content Transformation and Transcoding -- Spyglass Prism enables the transformation of Internet content from XML or HTML into a variety of wireless content formats, such as Wireless Markup Language (WML), Compact HTML (C-HTML), Mobile Markup Language (MML), as well as **other** formats.

Performance and **Content** Delivery -- Infrastructure software products from Inktomi Corp. including Traffic Server(TM), Network Cache Platform and Content Delivery Suite enable faster and on-time access to wireless content and applications by storing frequently accessed data closer to the network edge or the end-user.

Wireless Location Infrastructure -- Wireless location servers provide network operators with the ability to determine the location of mobile subscribers in order to provide them with relevant content and services. SignalSoft's local.info and Cambridge Positioning Systems' CURSOR are key location solutions in Sun's portfolio of wireless solutions.

Security, Authentication and Authorization -- Sun has incorporated Entrust.net WAP Server Certificates from Entrust, getAccess from enCommerce, and iPlanet's Sun SecureNet solution into its portfolio for the security and integrity of eBusiness data on wireless information, communications and transactions.

Wireless Billing and Customer Care -- To address the wireless service providers' need to develop and incorporate flexible billing and customer support capabilities, Sun has included Siebel System's Wireless eBusiness applications and Portal Software's Infranet in its iForce Solution Set.

Wireless Application and Content Services -- Wireless application and content service providers enable customers with turn-key, custom, and hosted wireless applications and content. Key applications include financial services, telco, search, directory, location-based information and enterprise work-force automation. iForce wireless solution set members delivering these solutions on the Solaris Operating Environment platform include 724 Solutions, Aether, Everypath and AirFlash.

Professional Services -- New Sun(SM) .Com Consulting Services for Wireless Service Providers helps customers build network services platforms that can handle massive scale with confidence. Sun platforms can securely and reliably support accelerated growth requirements and can be designed to fulfill a wide range of accessibility requirements. Sun consultants help customers design and deploy an integrated solution that enables maximum performance, high availability, orders-of- magnitude increases in scale, and the flexibility to adapt to ever changing business and technical requirements.

More solutions, enabling specific vertical and horizontal application and industry needs, will be added to the portfolio based on identified market need and qualified application and technology availability.

iForce Ready Center: Painless Solution Trial and Infrastructure Design

Customers who need hands-on, in-person help to dot-com their businesses, can take advantage of Sun's iForce Ready Centers, which conduct proof-of-concept demonstrations of Sun and industry partner solutions. The center provides customers with architectural blueprints or guidelines for the design, development and deployment of dot-com services on the Sun platform. This center can assist Sun customers with everything from brainstorming the technological options for creating a wireless infrastructure, to quick proof- of-concept implementation, to actual pilot programs.

About iForce Solution Sets

An iForce Solution Set is an aggregation of established best-of-breed applications that are scalable, easy to customize and follows open standards. These portfolios of solutions give customers a jump on the dot-com process by providing a scalable, proven blend of software,

hardware, networking, financing and consulting services all in one simple, manageable relationship. In addition to the iForce wireless solution set, Sun today announced iForce Solution Set for IBPP (see "Sun Microsystems, iPlanet, VeriSign and Portal Software Launch the iForce Solution Set for Internet Bill Presentment and Payment"). Previously, Sun announced the iForce Solution Set for Retail and the iForce Solution Set for Portals. By design, Sun iForce Solution Sets are a growing community of products and technologies that cut through the noise in the marketplace by identifying the best in their class, helping enterprises to immediately fulfill their eBusiness strategies and compete more effectively in the Internet economy. iForce Solution Sets can help a company create a sustainable dot-com business advantage while reducing risk, shortening time-to-market and minimizing the dot-com investment.

Availability

The iForce Solution Set for Mobile Wireless Internet is now available through participating solution providers and will be shown at Sun's iForce Ready Center. For more detailed information including technical specification, white papers, and sales contacts please visit <http://www.sun.com/iforcewireless/> .

About Sun Microsystems, Inc.

Since its inception in 1982, a singular vision -- The "Network Is The Computer"(TM) - has propelled Sun Microsystems, Inc., to its position as a leading provider of industrial-strength hardware, software and services that power the Internet and allow companies worldwide to dot-com their businesses. With \$14.2 billion in annual revenues, Sun can be found in more than 170 countries and on the World Wide Web at <http://sun.com> .

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*Please see release addendum "iForce Solution Set for Mobile Wireless Internet Participant Testimonials"

iForce Solution Set for Mobile Wireless Internet Participant Testimonials

iPlanet E-Commerce Solutions, a Sun-Netscape Alliance

"A consistent, complete set of solutions like the iForce portfolio will significantly accelerate delivery of standards-based mobile services. iPlanet contributes an tremendous track record of internet and service provider success, and we look forward to working even more closely with the iForce solutions providers going forward to continue driving wireless market expansion." -- Dr. Stuart Wells, Senior Vice President, iPlanet E-Commerce Solutions

724 Solutions, Inc.

"724 Solutions believes in empowering consumers by providing access to the information that is most important to them -- on any mobile device. Working with industry-leading partners such as Sun Microsystems, we continue to build upon our highly scalable, secure and robust financial services platform to enable financial institutions to deliver a personalized wireless offering. Being part of Sun's iForce Solution Portfolio for Mobile Wireless Internet provides us with a new channel to reach our customers and, ultimately, consumers around the world." -- Greg Wolfond, Chief Executive Officer, 724 Solutions Inc.

AirFlash

"AirFlash is a leading provider of wireless location-based content and m-Commerce infrastructure for mobile carriers and portals. We are very excited that Sun selected AirFlash as part of its iForce solution set because of our ability to provide uniquely compelling location-based content for mobile users." -- Rama Aysola, Founder and CEO, AirFlash, Inc.

Art Technology Group (ATG)

"We are pleased to deepen our partnership with Sun by having ATG's Dynamo Product Suite be part of the iForce solution set because of the clear value the portfolio brings to customers. The wireless channel presents a tremendous opportunity for e-businesses and Dynamo allows those companies to fully capture the value of personalized customer relationships over the wireless Web today. Our commitment to industry standards, including J2EE(TM), makes it possible for businesses to quickly launch multi-channel applications built on the Dynamo Product Suite with the flexibility to readily inter-operate with third party solutions and the scalability to keep up with hyper growth." -- Joseph Chung, CTO, Art Technology Group

BroadVision

"BroadVision provides a comprehensive suite of integrated and personalized e-business applications that have enabled many customers to leverage targeted Web-to-wireless today. Delivering that information via wireless devices creates increased performance demands as more users access the Web from anywhere. BroadVision's current live customers prove the applications, on a Sun platform, support this demand." -- Simon King, Vice President, Products, BroadVision, Inc.

Entrust Technologies

"Sun's Wireless Solutions portfolio consists of best-of-breed technology designed to help customer organizations do business anywhere, anytime, using the device of choice. As one of the first companies to deliver **digital** certificates to enable trusted wireless transactions, we're pleased to contribute solutions to the Sun portfolio to secure the integrity of e-business transactions and communications for customers." -- Bob Heard, Senior Vice President, Marketing and Business Development, Entrust Technologies

EveryPath, Inc.

"EveryPath is honored to be one of the companies handpicked by Sun as a key enabling component of the iForce wireless solution set. As a wireless application service provider (ASP), we give customers a rapid on-ramp to the wireless Internet. We leverage their existing web assets so customers don't need to create a separate wireless site. What companies originally developed for the wired Web is what their wireless customers will get on their wireless site -- the transaction capability, security and content that customers have come to expect. We enable customers to leverage their existing back end systems and infrastructure, reduce the need for custom programming and can dramatically save implementation time and cost." -- Venkatesh Shukla, CEO, EveryPath

Portal Software

"Sun has put together an outstanding set of solutions for wireless Internet service providers. Today's dynamic wireless Internet businesses require proven products that are scalable and flexible -- qualities which are at the core of Infranet. We are confident that the solutions enabled by Sun will greatly improve time to market for service providers." -- Steve Sommer, Vice President, Marketing and Business Development, Portal Software Siebel Systems

"Siebel Wireless allows consumers to more effectively communicate with suppliers and companies, and effectively share customer information across multiple distribution channels. Participating in Sun's iForce Solution Set for Mobile Wireless Infrastructure enables Siebel to reach even more companies and help them quickly deploy wireless-enabled Web sites and applications to support sales, channel management and customer organizations of all sizes." -- Bruce Cleveland, Vice President, Alliances,

Siebel Systems

Spyglass

"Sun's iForce wireless solution set promotes the creation of wireless content delivery solutions that can be unique to each customer's own requirements. The ability of Spyglass Prism to transform Web content into the many formats of the increasing variety of wireless devices is an essential step in any delivery system that supports multiple handsets and PDAs." -- Jack Armstrong, Vice President, Mobile Data Solutions, Spyglass Inc.

Vignette

"Vignette has been on the leading edge in recognizing the growing customer demand for personalized content delivered through multiple channels like wireless. Our participation in Sun's iForce solution set provides customers with an excellent opportunity to evaluate Vignette's wireless platform for the emerging technologies required to drive business in the wireless era." -- Bill Daniel, Senior Vice President, Products, Vignette

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13/9/20 (Item 20 from file: 610)

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Coollogic Announces New Web Site For Free Embedded Linux Downloads --www.rtkernel.org

Business Wire

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DALLAS, Apr 5, 2000 (BUSINESS WIRE)

- Coollogic Inc., a leader in embedded Linux software and Internet appliances, announced today the launch of www.rtkernel.org, a free commercial site for embedded, real-time Linux downloads.

The new vendor-neutral site, which will offer the latest Coollogic version of the real time (RT) Linux kernel, was developed and is sponsored by the company in order to support the foundation of open source software. The RT kernel is available for free and immediate download.

"Our goal is to make www.rtkernel.org the official source for the real time Linux kernel," said Eric Powers, vice president of software engineering for Coollogic. "Much like www.kernel.org, this website will continue to support the concept of free Linux software for the benefit of embedded systems developers and software and hardware product managers worldwide."

Coollogic is dedicated to promoting open development of the real time Linux kernel because it benefits other companies operating in the post-PC market. Because the RT kernel is free and immediately accessible, Internet appliance manufacturers can reduce their time to market and expenses. Additionally, www.rtkernel.org supports the GNU public **license** agreement, **under** which Coollogic operates.

The RT kernel is a free alternative to proprietary embedded operating systems. Coollogic, its customers and other Internet appliance and Linux software developers will benefit from the new website because it leverages open source technology into non-X86 platforms and ports. Software developers are encouraged to contribute to the embedded, real time kernel.

Content for the website will consist of the real-time kernel source code, documentation of the RT kernel and links to similar, helpful Linux websites.

Coollogic encourages those interested in the operating system to become contributors to the site, in order to maximize usage of the RT kernel and acceptance of embedded Linux operating systems. The promotion of the free software as a serious solution and alternative to other operating systems is essential to the success of all Linux operating systems, said Powers. "The contributions of the Linux community, whether to the RT kernel, message boards or the resource list, will demonstrate the power of open source software."

Other content to be developed for the site includes reviews of hardware and software, directory and resource **links**, bug tracking and version control.

Coollogic, as part of its sponsorship, will loosely manage the **content** of www.rtkernel.org.

About Coollogic, Inc.:

Coollogic is a developer of innovative Internet appliances and embedded Linux software. Its Internet Ready(tm) solutions combine the Coollinux(tm) software, e-Pilot(tm) hardware and popular applications and services in a business-to-business model. The Coollogic Internet Ready(tm) solution provides businesses a turnkey package of reliable software, easy-to-use hardware and Internet access through service providers and custom portals. Coollogic's software and hardware solutions offer Internet appliance manufacturers (OEMs) and Vertical Market Integrators (VMIs) a way to provide their customers with customized, simple and affordable Internet and network access. The company was founded in April 1997 in Dallas, Texas. Distributed via COMTEX.

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KEYWORD: TEXAS
INDUSTRY KEYWORD: SOFTWARE
COMPUTERS/ELECTRONICS

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Event Names: TECHNOLOGY DEVELOPMENT

13/9/21 (Item 21 from file: 610)

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A Pet Lovers Dream Comes Online; GoodPets.com Launches the Biggest & Best Online Pet Super Store Ever

Business Wire

Wednesday , September 8, 1999 ? 09:03 EDT

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NEW YORK, Sep 8, 1999 (BUSINESS WIRE)

- Zero-G Commerce Announced the Launch of
GoodPets.com(TM) The Internet's Favorite Pet Store

Zero-G Commerce Corporation, the owner and operator of a growing portfolio of e-commerce services today announced the launch of its latest Internet-based superstore, GoodPets.com(TM): The Internet's Favorite Pet Store on the World Wide Web at <http://www.goodpets.com>.

GoodPets.com(TM) features the most extensive array of pet supplies to be found on the Internet. The site includes numerous pet food products, pet accessories, and resources for pet owners such as books and videos and well as valuable **links** to **other** related web **content** focusing on the care of domestic pets. GoodPets.com(TM) is unique insofar as

hard-to-find products like a drag racer for a hamster and a tuxedo for a ferret are available to GoodPets.com(TM) shoppers with a simple keystroke. GoodPets.com(TM) caters to needs of dogs, cats, birds, fish, and reptiles as well as to those of small animals. The site draws its uniquely charming look from the illustrations of world famous cartoonist Charles Barsotti.

"For any pet lover and every pet owner, GoodPets.com solves the problem of finding hard-to-find items, taking a trip to the pet store and remembering to stock up on a monthly basis," said Mark Kahn, President and CEO of Zero-G Commerce Corporation. "And the wonderfully amusing illustrations by Charley Barsotti gives GoodPets.com(TM) we feel, just another 'paw' up on the competition. We are extremely excited about launching GoodPets.com(TM) and are committed to providing great service for all customers and individuals visiting our site."

About Zero-G Commerce Corporation

Zero-G Commerce Corporation, The Way E-Commerce Works(TM), a privately held company, is known for creating, developing and operating electronic commerce stores on the global Internet. The Company launched its first Internet-based store, a gourmet food emporium called Caesar's Palate: The Epicurean Empire (<http://www.caesarspalate.com>) in July 1998, and launched its second online store, a natural vitamin and supplement service called Nature's Aide (R) (<http://www.naturesaide.com>) in April 1999. The Company anticipates launching a home improvement portal and Do-It-Yourselfer's superstore called iRenovate.com later this year. Zero-G Commerce(TM) is a trademark of the Zero-G Commerce Corporation. Caesar's Palate(TM) is a trademark of the Zero-G Commerce Corporation. GoodPets.com (TM) is a trademark of the Zero-G Commerce Corporation. Nature's Aide(R) is a registered trademark of N.M.N. Vitamins, Inc. a Connecticut Corporation, used **under license** by Zero-G Commerce Corporation. iRenovate.com(TM) is a trademark of the Zero-G Commerce Corporation. All **rights** reserved.

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GEOGRAPHY: NEW YORK

INDUSTRY CODE: INTERACTIVE/MULTIMEDIA/INTERNET
COMED
RETAIL
PRODUCT

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Company Names: CONNECTICUT SRL; CONNECTICUT BVBA

Product Names: INTERNET; PETS; PET PRODUCTS; COMMUNICATIONS TECHNOLOGIES; COMPUTERS

Event Names: DISTRIBUTION CHANNELS

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CHEMICALS

Late this month, NIPPON FLUOROWARE K.K. is scheduled to begin making fluoroplastic injected-molded wafer-handling carriers for the semiconductor industry at its Yonezawa, Yamagata prefecture factory. NIPPON VALQUA INDUSTRIES, LTD., which owns 10 percent of the company, has been producing this product but, as part of a reorganization of its fluoroplastic business, decided to hand over production to Nippon Fluoroware. Manufacturing equipment is being transferred to Nippon Fluoroware as well as up to 20 employees. Chaska, Minnesota-headquartered ENTEGRIS, INC. is the joint venture's majority (90 percent) owner. This critical materials management company was formed in June through the merger of FLUORO-WARE, INC. and a Colorado Springs, Colorado firm in the same business.

To better support users of its semiconductor-grade materials, DOW CHEMICAL CO. tied up with HITACHI CHEMICAL CO., LTD. Under the agreement, the Tokyo company will handle sales, technical support, warehousing and distribution of Dow's SiLK semiconductor dielectric resins, Cyclotene dielectric resins and ancillary chemicals for the semiconductor interlayer dielectric market. People at Dow's subsidiary will be detailed to Hitachi Chemical to share technical support and marketing responsibilities for these products. SiLK resins, introduced in 1996, were developed specifically for use as an interlayer dielectric material in high-performance integrated circuits. They are enjoying growing acceptance in Japan, Dow says, in large part because they help to produce chips with faster processing speeds and reduced "cross talk." SiLK resins are suitable for all existing CMOS (complementary metal-oxide semiconductor) interconnect technologies using copper/damascene or aluminum/tungsten technologies.

Meanwhile, HITACHI CHEMICAL CO., LTD. became the fourth major company to be licensed by RE-SEARCH FRONTIERS INC. to make and market on a nonexclusive worldwide basis SPD (suspended particle device) film for electrically and instantaneously control-ling the amount of light passing through windows, sky-lights, sunroofs, eyewear and the like as well as for enabling brighter, easier-to-read flat-panel computer displays. The Woodbury, New York company also gave Hitachi Chemical the right to make and sell to authorized users emulsions used to produce SPD film. Earlier, Research Frontiers made DAINIPPON INK AND CHEMICALS, INC. the first licensed supplier of its emulsions (see Japan-U.S. Business Report No. 358, July 1999, p. 13).

With a reimbursement price set for Gemzar (gem-citabine HCl), ELI LILLY AND CO.'s subsidiary is marketing this first-line treatment for inoperable, locally advanced or metastatic nonsmall-cell lung cancer. A nucleoside analogue that is used with cisplatin, another anticancer drug, the chemotherapeutic agent disrupts the process of cell replication,

thereby slowing or stop-ping the progression of the lung cancer. Gemzar, which the Ministry of Health and Welfare approved for sale last March, also is indicated for the treatment of pancreatic cancer, although this use has not yet been approved in Japan.

ZENYAKU KOGYO CO., LTD. will have exclusive **rights** to commercialize for the Japanese market a psori- asis immunotherapeutic agent codeveloped by CO-RIXA CORP. of Seattle and New Zealand's GENESIS RESEARCH AND DEVELOPMENT CORP. PVAC currently is in Phase I/II trials in the Philippines. Under the multiyear agreement, Corixa will receive licensing fees, research funding and milestone payments from its Tokyo partner as well as royalties on future product sales. The American R&D-based biotechnology company recently gave JAPAN TOBACCO INC. **rights** to commercialize vaccine and antibody-based products from lung cancer antigens that it had developed (see Japan- U.S. Business Report No. 358, July 1999, p. 13). Through participation in the Microarray Technology Access Program - an integrated system for high-throughput, quantitative gene expression analysis and functional genomics - TAKEDA CHEMICAL INDUS-TRIES, LTD. has gained preferential access to the global microarray technologies of Sunnyvale, California-based AMERSHAM PHARMACIA BIOTECH CORP. Takeda Chemical is the first major Japanese pharmaceutical company to join MTAP, an international consortium of some 30 drug, biotechnology and genomics companies and academic organizations interested in using DNA (deoxyribonucleic acid) microarrays to accelerate their R&D efforts. Amersham Pharmacia Biotech is the life sciences affiliate of PHARMACIA & UP-JOHN, INC. (45 percent) and NYCOMED AMERS-HAM, PLC (55 percent).

Engineers from the Murray Hill, New Jersey industrial gases business of BOC GROUP PLC and MITSU-BISHI CHEMICAL CORP. have codeveloped a new process for making maleic anhydride, a product used extensively in the production of synthetic fibers, resins, plastics, elastomers and rubber. The technology combines a MCC-developed catalyst for the oxidation of butane with a patented BOC Gases selective hydrocarbon separation system that recovers and recycles unreacted butane from the maleic anhydride. The process has been deployed at a MCC pilot plant in Kurashiki, Okayama prefecture. Japan's top chemical manufacturer also plans to build a bigger facility to expand production using the joint technology. Both BOC Gases and Mitsubishi Chemical are licensing the technology. A Hawaiian marine biotechnology firm that produces an astaxanthin-rich product from microalgae has made its first sale in Japan. AQUASEARCH INC. did not name the buyer, describing it only as a life sciences company. Microalgae or microscopic plants produce many unique bioactive compounds that have application in such fields as natural colorings, nutraceuticals, pharmaceuticals, cosmetics and agrichemicals.

COMPUTERS AND PERIPHERALS

Few recent announcements have raised so many eyebrows in the computer world as the news that SILICON GRAPHICS, INC. and NEC CORP. would sell each other's supercomputers in Japan. The surprise re- flected the assumed animosity between the two resulting from the ultimately successful 1996-98 campaign waged by SGI's Cray unit, then an independent company, to prevent NEC from leasing a number-crunching computer to a partly government-funded U.S. climate research laboratory on what Washington agreed were unfair terms. Neither company said explicitly why they had decided to cooperate. One factor no doubt is the difficulty both have experienced selling high-performance computers in Japan's current economic climate and with mainstream computers becoming ever more powerful. Moreover, for months, Silicon Graphics has been attempting to restructure its subsidiary's operations to make them more growth-oriented. Whatever the reason for the tie-up, it marries SGI's expertise in both traditional vector supercomputers (Cray SV1, Cray T3E and Cray T90) and scalar supercomputers (the SGI Origin 2000) with NEC's vector architecture.

New marketing partners SILICON GRAPHICS, INC. and NEC CORP. did not have to wait very long to receive their first contract. The Institute of Fluid Science at Tohoku University, a longtime Cray customer, ordered a

massive high-performance computing solution that has at its core a 640-processor version of the scalar SGI Origin 2000 supercomputer as well as NEC's new SX-5 vector supercomputer with 16 central processors. The hybrid system will have a data-processing capacity unmatched in Japan. Including workstations and other peripherals, the contract is worth \$44.3 million.Its new relationship with NEC CORP. also worked to SILICON GRAPHICS, INC.'s advantage when its partner received an order from the National Research Institute for Metals, part of the government's Science and Technology Agency, for a SX-5 system to replace the NEC supercomputer it has used since 1995. The system, slated to be operational in April 2000, will use SGI file and graphics servers. The SX-5 covered by the contract will be the biggest supercomputer NEC has ever built, featuring a top performance of 256 gigaflops (billion operations per second) and a 128-GB main memory.

IBM JAPAN LTD. sold MITSUI MARINE & FIRE INSURANCE CO., LTD. on the cost benefits of out-sourcing its computer operations. The 10-year contract, worth an estimated \$238.9 million, is expected to save the number-three property and casualty insurer some 10 percent of what it otherwise would have spent on in-formation technology requirements.IBM JAPAN LTD. reportedly will be tapped to run an on-line banking service for regional banks. JUROKU BANK, LTD. of Gifu prefecture and SURUGA BANK, LTD., which does most of its business in Shizuoka and Kanagawa prefectures, are spearheading the project. They expect to enlist as many as 30 fellow regional banks across the country by fall 2000. The sign-up cost will be about \$885,000 per bank, plus anywhere from \$212,400 to \$265,500 in annual fees. IBM Japan will install a **server** for each of the participating banks at one of its operations centers and **link** that machine to a bank's own data center.

By 2000, HEWLETT-PACKARD JAPAN LTD. forecasts, 80 percent of the PC servers that it sells will be assembled at the company's factory in the Hachioji section of Tokyo. That switch will give corporate customers the chance to tailor the systems to their specific requirements. HP Japan already has started to provide some HP NetServer workgroup and departmental servers on a build-to-order basis. Previously, all of its PC servers were produced in the Philippines.

HEWLETT-PACKARD JAPAN LTD. has unveiled two other initiatives designed to boost revenues. It has begun a program to directly lease its most powerful servers and other computer equipment to promising Internet start-ups. These venture businesses lack the financial track record to lease hardware from mainstream leasing companies. At least one company that plans to auction used cars over the Internet already has taken advantage of HP Japan's new service. It signed a three-year lease on a \$354,000 Web server system. Under a companion program, HP Japan will tailor leases for Internet start-ups not only to hardware specifics but also to the number of users, hours of use and similar variables. In the year starting in November, HP Japan hopes to conclude direct lease contracts worth \$442.5 million.

GATEWAY 2000, INC.'s subsidiary already has opened Gateway Country stores in Tokyo, Nagoya, Osaka, Kobe, Hiroshima, Sendai and two other cities to complement its direct sales over the Internet or by phone. Now, it is experimenting with another retail concept. Gateway set up an in-store shop at a DAIEI, INC. outlet in Chiba prefecture in an attempt to piggyback on the business of mass merchandisers. The shop is staffed by Gateway personnel who can help consumers figure out what kind of PC they want. If this experiment is successful, Gateway will consider extending the format to other locations.

A line of what are known as immersive-visualization graphics workstations is on the market from HEWLETT-PACKARD JAPAN LTD. with marketing support from NISSHO ELECTRONICS CORP. Equipped with ultra-high-resolution displays that measure up to 30 feet wide, the HP VISUALIZE Center allows entire project teams in the automotive, aerospace and related industries as well as in the scientific community to optimize

product development and scientific visualization.

Members can walk through an entire, full-size visual vehicle, airplane or building, interact with the data and re-solve design problems in real time before physical prototypes are built. Integral to the solution are HP VISUALIZE Unix workstations and HP VISUALIZE fx6 3D graphics with texture-mapping acceleration. HP Japan priced the HP VISUALIZE Center from \$672,600.

COMPAQ COMPUTER CORP. redefined the entry point to the high-end AlphaServer GS Series, a 64-bit computing line designed for the most demanding enterprise and technical-computing applications. The Alpha-Server GS60E can support as many as six 525-MHz Alpha 21264 (EV6) processors and provides up to 12 GB of system memory. It also allows hardware partitioning and features 64-bit Very Large Memory capabilities. The base configuration of the AlphaServer GS60E, which has two processors and 1 GB of internal memory, costs roughly \$144,200 for a machine running the Tru64 Unix operating system or \$147,800 for one using OpenVMS. Over the next two years, SUN MICROSYSTEMS, INC.'s subsidiary believes that it will be able to sell 20,000 units of the new Netra t1 Model 105 carrier-grade server to Internet services providers. Its optimism has several causes. For starters, the system is just 1.75 inches high, allowing 40 of them to be stacked in a 19-inch rack. That is two to four times more than is possible with competing systems. As a result, ISPs can more easily and cost-effectively dedicate separate systems to individual customers or to different infrastructure applications. Greater redundancy also can be built in. In addition, the Netra t1 incorporates several ease-of-management features, including remote monitoring and control. The clincher in Sun's opinion is the price. A Netra t1 Model 105 with a 360-MHz UltraSPARC IIIi processor, 64 MB of system memory and a 9.1-GB hard drive is just \$8,700.

Upgraded graphics accelerators now are standard on COMPAQ COMPUTER CORP.'s Windows NT-based line of Professional Workstation AP/SP models, which represent the big computer maker's attempt to balance the latest in processor technology and high-performance 2D and 3D graphics solutions with affordable pricing. For jobs that require entry-level 3D graphics using the Professional Workstations AP200 and AP400, the company switched its basic offering to ELSA Synergy II from ELSA GLoria Synergy. With the Professional Workstations AP500 and SP700, Compaq is shipping 3DLabs Oxygen GVX1. This controller is designed for technical professional users seeking a mid-range 3D graphics capability.

The rollout of Windows NT-based workstations incorporating the latest in Pentium III Xeon processor technology continues. The 550-MHz version of this engine, which has a 100-MHz system bus and full-speed cache, now powers DELL COMPUTER CORP.'s dual-processor-capable Precision WorkStation 610. Pricing for this high-end product starts at just \$3,200.DELL COMPUTER CORP.'s subsidiary also brought the performance-enhancing 550-MHz Pentium III Xeon processor to the PowerEdge 6300 server. Designed for the most demanding business applications, this system supports four-way multiprocessing. The base configuration is priced from \$7,500.

In a further sign that American computer vendors believe that the Linux operating system could become just as popular in Japan as it is positioned to be in the United States, HEWLETT-PACKARD JAPAN LTD. is marketing its first PC server package with the freeware version of Unix preinstalled. The vehicle is the HP Net-Server E 60, a machine touted as easy to set up, back up, troubleshoot and expand. HP Japan priced the renamed HP Linux E 60 at less than \$4,400, including three years of support and service. A package without support services also is available.

Some of the first products that COMPAQ COMPUTER CORP.'s subsidiary is offering through its new direct sales channel (see Japan-U.S. Business Report No. 359, August 1999, pp. 14-15) are the four models making up the network-targeted Prosignia Desktop 330 family. Equipped with the Windows NT 4.0 Workstation operating system, these built-to-order systems can be configured with either a 450-MHz or a 550-MHz Pentium III processor, 64 MB to 384 MB of internal memory and 8.4 GB to 37.7 GB of storage, plus a 52X

CD-ROM drive. Pricing starts at a low \$1,200-plus (excluding a monitor), which Compaq thinks will give it an edge on the competition.

The power of the 600-MHz Pentium III chip has been brought to DELL COMPUTER CORP.'s desktop line for demanding networks. The base model of the OptiPlex GX1 600S, which includes a 440BX chipset, comes with 64 MB of system memory and a 6.4-GB hard drive. It lists for \$1,600. That is almost \$600 less than the previous entry-level OptiPlex GX1, which was powered by a 550-MHz Pentium III. Perhaps even more than its American rivals, Dell has been slashing prices on new products as well as deeply discounting the models they replace. The cuts extend to PowerEdge servers, OptiPlex GX1p desktops and Latitude notebooks.

In a worldwide release, DELL COMPUTER CORP. introduced its least expensive desktop system to date for corporate users. In Japan, the OptiPlex GX100 starts at \$870. That buys a small-form-factor machine with a 400-MHz Celeron processor together with the new 810 chipset, 4 MB of dedicated graphics memory, 32 MB of synchronous DRAM memory, a 4.3-GB hard drive, a 1.44-MB floppy drive, integrated 10/100 networking and a 15-inch monitor.DELL COMPUTER CORP.'s subsidiary soon outdid its parent. It released a Japan-only product, its first ever, that costs as little as \$660 without a monitor and \$840 packaged with a 15-inch display. Either price for the Dimension J400c, which is aimed at the SOHO (small office/home office) market, includes a 400-MHz Celeron processor along with the 810 chipset, 64 MB of SDRAM and 4.3 GB of storage. Fellow direct marketer GATEWAY 2000, INC. quickly met this challenge. It, too, broke the (yen)100,000 pricing barrier for desktops with the \$885 GP6-400c. The specifications of this midtower machine parallel those of the Dimension J400c: a 400-MHz Celeron processor, a 440ZX chipset with AGP (accelerated graphics port) support, 64 MB of SRAM, a 4.3-GB hard drive and a 15-inch monitor. However, the price for the Gateway system also covers three months of Internet access.

GATEWAY 2000, INC.'s subsidiary also expanded its lineup of affordable, small-form-factor PCs for businesses with the release of a new E-1400 model. Priced from \$850 without a monitor, this system comes with a 400-MHz Celeron processor that has 128 kilobytes of cache, 64 MB of internal memory and a 6.8-GB hard drive. It takes up less than half the space of traditional PCs. It is easy to service or upgrade because the mother-board, power supply and hard drive are removable.

At the same time that it goes after corporate buyers of desktop machines, GATEWAY 2000, INC.'s marketing unit is putting more emphasis on the notebook market. It has doubled the number of people providing support for users of its portable computers and allocated more money for advertising its notebooks. These moves coincided with several model launches. One was a version of the Solo 9300 that can be used for **digital** video editing. This product, which starts at less than \$2,700, offers a choice of a 400-MHz mobile Pentium II processor, a 366-MHz Celeron or its 400-MHz cousin. It features a 15-inch XGA active-matrix TFT color display and a high-speed IEEE 1394 serial bus. This Solo 9300 also can be equipped with a CD-rewritable drive. Gateway released as well three notebooks that include in their price one year of Internet access and some other free services - a marketing strategy that it has used to sell certain desktop models. A Solo 3100 portable with a 266-MHz Celeron chip lists at less than \$1,800, while the Solo 2500 Internet model, which uses a 333-MHz Celeron processor, goes for \$1,900. The third model, priced at \$2,500, is part of the Solo 9100 line. It uses a 333-MHz Pentium II processor.

The latest entry from DELL COMPUTER CORP. in the notebook sweepstakes is the Latitude CS-R400XT. A lightweight (4.3 pounds), thin (1.1 inches in height) system despite its 13.3-inch color display, this product is powered by a 400-MHz mobile Pentium II processor with AGP performance. The starting price of \$2,400 includes 64 MB of SDRAM and a 4.8-GB hard drive.

In a significant win for INTERGRAPH CORP., its subsidiary teamed with MEDIA 100 INC. to deliver Finish content-creation video systems to two schools offering **digital** media training and certification

courses. The deals with Japan Electronics College and **Digital** Contents Academy 3Dplus, also located in Tokyo, included the installation of 16 of the Huntsville, Alabama manufacturer's TDZ 2000 Video Workstations for the Windows NT operating environment. Between them, JEC and 3Dplus are said to have the largest number of professional nonlinear editing systems of any Japanese school. Their classes are aimed at aspiring **digital** media engineers and creators.

NCR JAPAN, LTD., which has built a substantial business for itself by catering to the hardware and soft-ware requirements of nationwide retailers, has introduced a state-of-the-art, Japan-only system for chains that takes advantage of the Web. For stores themselves, the RPRO FSP Solution consists of NCR 7452POS (point of sale) machines and the NCR 7401 Web Kiosk Terminal. Ten of the POS systems cost \$132,700, while the terminal is priced from \$10,600. This equipment is **linked** to a **server** at the retailer's headquarters that costs \$79,600 and up. Over the next three years, NCR expects to sell 100 of the servers, plus 5,000 Web Kiosk Terminals and 30,000 POS machines.

IBM JAPAN LTD. signed an agreement with OMRON CORP. to supply it with automated teller machines on an original equipment manufacturer basis for sale in Asia outside Japan, South Korea and Taiwan. The computer giant will install its own software in the ATMs and also handle after-sale service. The five-year deal, which starts in October, could involve as many as 30,000 machines, giving a major boost to Omron's share of the world ATM market. IBM Japan anticipates strong demand for ATMs from financial institutions in the People's Republic of China and elsewhere in Asia in coming years.

The latest product from the marketing unit of enterprise storage systems world leader EMC CORP. is the Celerra File Server. This system combines Symmetrix Enterprise Storage technology with what the company says is a novel approach to software and hardware. In EMC's opinion, this marriage delivers unprecedented levels of availability, management, scalability (up to 37 terabytes) and performance to network file storage. Key to the performance claim is software optimized for moving data. Moreover, a single Celerra File Server can simultaneously support mixed Unix and Windows NT environments. Operable over local networks, including Gigabit Ethernet, and wide area networks like the Inter-net, the network file server's pricing starts at \$765,500.

With two additions to the HP SureStore E on-line storage product family, HEWLETT-PACKARD JAPAN LTD. promises HP 9000 Enterprise Server customers that they can match their storage investments to the specific amount of disk space needed for a given application and add capacity as necessary. The HP SureStore E Disk Array FC60 is a native Fibre Channel RAID (redundant array of independent disks) array offering high availability, up to a terabyte of capacity and high-speed data transfer. Designed for large-scale, business-critical applications, it can be configured with four to 60 disks. The basic system costs \$61,700. For small to mid-size ISP and e-commerce applications and Unix file/ print operations, HP Japan is marketing the HP Sure-Store E Disk System SC10. It can be built with four to 10 Ultra2 SCSI disks with a top capacity of 182 GB per enclosure. The standard SC10 model lists for \$22,300. Between the two products, HP Japan expects to generate sales of \$35.4 million in the first year.

HEWLETT-PACKARD JAPAN LTD. also figures that over the coming year, its customers will buy 1,000 of its latest DAT (**digital** audio tape) system for backing up midsize networks. The HP SureStore DAT24eU, which is compatible with leading Unix and Windows NT servers and workstations, has a compressed data capacity of 24 GB per DDS-3 (**digital** data storage) cartridge and a sustained transfer rate of 7.2 GB an hour, again with hardware data compression. This particular model, which lists for \$2,100, comes with a SCSI cable and terminator as well as a power cable and a power supply.

ULTERA SYSTEMS INC., which bills itself as the leading manufacturer

of RAID tape array controllers and subsystems for high-speed backup, archival and data acquisition applications, appointed MACNICA, INC. as its master distributor. The Laguna Hills, California company's product line, which is compatible with all industry-standard tape drives, tape libraries and storage management software, spans the name-indicative Stripper, LibraryMaster, Imager and Shadow-Master Series.

Once again, INTERNATIONAL BUSINESS MA-CHINES CORP. has managed to pack a record amount of capacity into a notebook PC hard drive. The Travelstar 25GS, designed for the premium end of the market, holds 25.3 GB of data, four times as much as the average portable hard drive. Moreover, at 5,400 revolutions per minute, the drive tops the speed of any competitor's, adding to performance. The Travelstar 25GS will be used in IBM JAPAN LTD.'s high-end ThinkPads as well as in notebooks from other manufacturers. IMATION CORP.'s subsidiary is upbeat about prospects for its 120-MB SuperDisk USB external drive for both Macintosh machines and Windows PCs. It is forecasting sales of 5,000 SDD-120USB WM2Xs a month. The drive has an estimated street price of \$300. With the \$175 HP JetDirect 170X, small businesses with Windows machines can connect printers regardless of make to their networks. The result, HEWLETT-PACKARD JAPAN LTD. says, is an output speed that is up to six times faster than with a file server or a shared PC connection. The company is projecting sales of 20,000 units a year.

Color LCDs developed by COLORADO MICRO-DISPLAY, INC. that measure less than a half inch diagonally will be distributed to OEMs by SUMITOMO CORP., backstopped by the Boulder, Colorado company's new Tokyo sales and support office. Target applications for CMD's microdisplays, which reportedly can be produced at about one-fourth the cost of conventional displays with equivalent image quality, include head-sets for mobile computing, portable DVD players and wearable computers; viewfinders in **digital** cameras, camcorders and next-generation smart phones/Internet appliances; front and rear projection devices; and displays for a variety of industrial products. Sumitomo is so convinced that the microdisplays will find a broad market that it is projecting annual sales on the order of \$35.4 million within two years.

A third Japanese electronics manufacturer has been licensed to use EASTMAN KODAK CO.'s innovative organic electroluminescence technology in passive monochrome and color flat-panel displays for a variety of applications. Like PIONEER CORP. and SANYO ELECTRIC CO., LTD., which also has an OEL development partnership with Kodak (see Japan-U.S. Business Report No. 354, March 1999, p. 17), TDK CORP. no doubt was attracted to the lower power consumption, faster response time, better brightness, unlimited viewing angle and thinner design of displays incorporating OEL technology compared with today's LCD displays. Kodak will collect royalties from TDK.

Three products from RARITAN COMPUTER INC., a manufacturer of switches that allow the control of multiple computers from a single keyboard, monitor and mouse, are now available in Japan. The Somerset, New Jersey company's entry-level line is the Compu-Switch, which can connect any combination of two, four or eight PCs, Macs and Suns using any operating system. For centrally running anywhere from two to 256 multiplatform computers, Raritan offers the MasterCon-sole II. Its MasterControl MX switch goes a step further, allowing up to four people to simultaneously control as many as 256 computers (PCs, Macs, Suns, Alphas, RS/ 6000s, HP 9000s and SGIs) each from one keyboard/ monitor/mouse. Regardless of the product, a Raritan switch eliminates the cost and the clutter of multiple peripherals, reduces equipment space and helps to improve operational efficiency in such places as data centers, Web server farms and customer service operations. Pricing ranges from \$480 to \$11,100.

The ultimate in consumer desktop entertainment is how 3DFX INTERACTIVE, INC. describes the possibilities opened up by the new Voodoo3 3500 TV AGP card. It combines powerful 3D and 2D graphics with complete TV tuner and multimedia functionality. NISSHO ELECTRONICS CORP., the San Jose, California company's distributor since April, has priced the card at \$335.

It expects annual sales in excess of 20,000 units. 3dfx Interactive recently established a Tokyo marketing subsidiary (see Japan-U.S. Business Report No. 357, June 1999, p. 21).

CONSTRUCTION AND REAL ESTATE

Over time, the government's new private finance initiative should create business opportunities for U.S. engineering and construction companies. Already, civil engineering giant BECHTEL CORP. has agreed to work with big contractor TAISEI CORP. to win contracts for PFI projects and execute them. Under the private finance initiative, the public sector in Japan hopes to harness the resources, both financial and technical, of the private sector to build economic and social infrastructure. That could include anything from roads to incinerators. PFI is an attempt to get around the bottleneck to the implementation of public works programs caused by the inability of local governments to come up with their share of the money because of strained finances. With technical assistance from Houston's HORIZONTAL DRILLING INTERNATIONAL, INC., which specializes in the installation of pipelines, conduits and cables beneath rivers, highways and similar barriers, SUMITOMO METAL INDUSTRIES, LTD. and an affiliate developed an improved method of what is called horizontal directional drilling. This technology marries conventional road boring and the directional drilling used for oil wells. As the Pipeline Arc-Shaped SMI-DRIX name of SMI's technique suggests, the installation is arc-shaped. In simplified terms, it is achieved by drilling a pilot hole at a prescribed angle from horizontal and continuing it under the obstacle, then enlarging the path with a reamer and finally pulling the pre-fabricated pipeline through. SMI estimates that its method not only cuts construction time but also reduces the cost of laying pipelines across barriers by 20 percent to 30 percent.

ELECTRIC MACHINERY

For such handheld scanning applications as retail point of sale and in-store inventory, distributor AINIX CORP. released WELCH ALLYN, INC.'s IMAGETEAM 3800 bar code scanner. It uses linear imaging technology rather than more conventional CCD (charge-coupled device) or laser technology, combining a bright, sharp aiming line with high-resolution imaging to deliver what the Skaneateles Falls, New York manufacturer says is an exceptional reading performance. The IT3800, which operates from a tabletop holder in manual trigger mode or can be placed in an adjustable stand for automated operation, is priced from \$790.

BOSE CORP. is making a major push to boost sales of its home theater audio systems, hoping to lift them within the current fiscal year to 30 percent of revenues from 20 percent or so. One key to this strategy is to reduce delivery times from the Japanese factory to which the premium speaker maker has consigned assembly of the systems. Another part is to increase imports of components from the United States. Bose also has boosted its advertising budget. One of the first home theater systems to benefit from the new push is a setup designed to produce movie theater-quality sound from standard two-track videotapes. To do this, Bose uses a **digital**-processing chip able to automatically differentiate between voices and other sounds and divide them among five speakers. Including speakers and amplifiers, the new home theater system costs \$2,200.

ENERGY RESOURCES

Japan's changing regulatory environment for electricity sales is starting to attract the interest of foreign companies that believe that they can undercut the high prices charged by the nation's 10 regional electric utilities. Since the start of 1996, independent power producers have been able to wholesale electricity to these former monopolies. Beginning next April, they also will be free to sell power directly to industrial users. TEXACO INC., for one, believes that these opportunities are worth exploring. It and KOA OIL CO., LTD. have agreed to study the feasibility of moving into the IPP business, including building power plants at Koa Oil's two refineries. Industry sources say that the two have

their eye on sales to KANSAI ELECTRIC POWER CO., INC. and CHUBU ELECTRIC POWER CO., INC. If they do win contracts, the same insiders add, Texaco and Koa Oil will build a 500,000-kilowatt thermal power plant at the Japanese company's Marifu, Yamaguchi prefecture refinery as well as at the one in Osaka. They could be operational as soon as 2003. Using Texaco technology, these power-generating facilities could sell electricity for 20 percent to 30 percent less than what Japan's electric utilities charge. Texaco and Koa Oil have no time frame for reaching a decision. Until recently, the American oil major owned 25 percent of its prospective Japanese partner (see Japan-U.S. Business Report No. 359, August 1999, p. 18).

FINANCIAL SERVICES

CITIGROUP INC. and NIKKO SECURITIES CO., LTD. are offering consumers the convenience of one-stop shopping for financial services on an experimental basis. CITIBANK N.A. has taken over one floor of Nikko Securities' Gotanda office in the Shinagawa area of Tokyo, offering investment trusts (Japanese-style mutual funds) and money-management advice as well as regular banking services. The big brokerage house sells its own financial products on two other floors. This is the first tie-up between Citigroup and Nikko Securities on the retail side of the financial services business since the holding company became the top investor in the securities firm and the Japanese broker's investment banking and institutional trading operations were spun off into a joint venture with Citigroup's SALOMON SMITH BARNEY INC. (see Japan-U.S. Business Report No. 354, March 1999, p. 19).

Detailing its retail strategy for Japan, major investment bank/brokerage house MORGAN STANLEY DEAN WITTER & CO. said that it would use four channels to distribute financial products and services to individual investors. Before the start of 2000, the company will open a branch office, presumably in the Tokyo area, to offer clients investment trusts and other products. At this time, executives indicated, Morgan Stanley is not planning to acquire an existing retail brokerage network like rival MERRILL LYNCH & CO., INC. did, although that option always is a possibility, the same insiders said. A tie-up with SANWA BANK, LTD. will provide a second distribution channel. Under this arrangement, the first Morgan Stanley has formed with a Japanese financial institution, the nationwide commercial bank will sell a number of the New York City firm's mutual funds at its branches starting this fall. The same products also might be available through four securities firms affiliated with Sanwa Bank. At several of the bank's branches, personnel from Morgan Stanley and Sanwa Bank will collaborate to get a better feel for exactly what types of money-management products are of greatest interest to individual Japanese investors and to try out various sales methods. The financial services provider also envisions similar deals with other Japanese financial institutions. These agreements will provide a third retail sales avenue. Finally, Morgan Stanley's on-line brokerage unit, DISCOVER BROKER-AGE DIRECT, INC., will offer Internet trading. The specifics of this move still need to be worked out, but the service probably will not be launched until the latter part of 2000, even though Japan will completely deregulate brokerage commissions October 1. Moreover, according to current thinking, Morgan Stanley will not steeply discount its charges to attract customers to its on-line trading activities. Instead, it plans to depend on the quality and the breadth of its services to win business, including the ability of its customers to invest directly in all the world's major stock markets.

Any number of companies, foreign and domestic, are betting that, in time, on-line investing will become just as popular in Japan as it is in the United States.

However, some American financial services providers are content for now to take a minority position in one of the Internet trading start-ups rather than spearhead the projected revolution in Japanese retail investing. For instance, J.P. MORGAN & CO., INC. acquired a small stake in MONEX INC., an on-line brokerage formed last spring by SONY CORP. and a

former investment banker. Through this venture, which expects to start operations in October, the New York City bank holding company hopes to find a market for its financial advisory services. J.P. Morgan already has extensive operations in Japan, including a tie-up with DAI-ICHI KANGYO BANK, LTD. in the asset-management field (see Japan-U.S. Business Report No. 355, April 1999, p. 18). Within five years, AMERICAN EXPRESS ASSET MANAGEMENT INTERNATIONAL (JAPAN) LTD. wants to be managing \$1 billion of assets for Japanese institutional investors. A primary means to this end is to offer financial products, particularly stock mutual funds, to the investment managers of corporate pension plans. Until now, AmEx Asset Management's main focus has been selling investment products to the more than 1.1 million AMERICAN EXPRESS CO. cardholders in Japan.

Setting the stage for its biggest move to date in Japan, the Tokyo District Court tentatively cleared the sale of bankrupt NIPPON ASSET MANAGEMENT INC.'s operations to GMAC COMMERCIAL MORTGAGE CORP. The Tokyo company was established earlier this year after JAPAN LEASING CORP., formerly part of the now-nationalized LONG-TERM CREDIT BANK OF JAPAN, LTD., sold its equipment leasing business to GE CAPITAL CORP. (see Japan-U.S. Business Report No. 353, February 1999, pp. 16-17). The 150-employee Nippon Asset Management took over Japan Leasing's real estate and other assets. They have a book value of about \$8.8 billion. Once the court approves Nippon Asset Management's restructuring plan, which must be submitted by the end of November, GMACCM will be free to take over its businesses and employees. The second-largest nonbank financial concern in the United States has been one of the biggest buyers and securitizers of property-backed nonperforming loans in Japan.

Cleaning up another part of the mess caused by the bankruptcy of LONG-TERM CREDIT BANK OF JAPAN, LTD., the company trying to find a buyer for the bank, GOLDMAN, SACHS & CO., purchased part of the real estate-backed loan portfolio of failed NIPPON LANDIC CO., LTD., a LTCB nonbank affiliate. The loans bought by Goldman, Sachs have an estimated book value of \$1.2 billion. They are expected to be securitized.Meanwhile, GOLDMAN, SACHS & CO. now is one of the 19 companies, eight of them foreign-affiliated, that the Ministry of Justice has licensed to serve as loan servicers. These companies are authorized to collect payments on property-backed loans for the lenders or for the buyers of nonperforming loan portfolios. They also can manage the underlying collateral. That right extends to selling it to third parties. The new, 12-person Goldman, Sachs loan servicing unit is handling the loans and the related properties acquired by its parent. GMAC COMMERCIAL MORTGAGE CORP. and CERBERUS PARTNERS, L.P. are among the other American investors that have their own loan-servicing units (see Japan-U.S. Business Report No. 356, May 1999, p. 19).

A new source of financing and managerial help will be available this fall for Internet-related start-ups. NETYEAR GROUP, INC. of Redwood City, California has opened a wholly owned subsidiary in Tokyo to scout out promising e-businesses to bankroll and get the ones that pass its test up and running. The money will come from Netyear Knowledge Capital Partners, which hopes to raise as much as some \$17.7 million. Netyear expects to invest in five Internet ventures within the first two months and then 10 to 20 companies a year. It will invest as much as \$442,500 in any one company, subject to a limit of half of the start-up's financing. Netyear was established by the holding company for Japan-based systems integrator INFORMATION SERVICES INTERNATIONAL-DENTSU, LTD., but it became independent in October 1998 through a management buyout.

In a decision aimed at expanding its core operation, AMERICAN EXPRESS CO. will unveil this fall a credit card designed specifically for small businesses. Available in the United States but now nowhere else in the world, the card will have a preapproved credit line of \$4,400 and will enable holders to receive discounts on a variety of goods and services, including office supplies, hotels, restaurants and car rentals. AmEx's subsidiary will market the card to small businesses through direct

mailings.

FOOD AND AGRICULTURAL PRODUCTS

The first T.G.I. Friday's restaurant with its American bistro menu has opened in Japan. Located in the Shibuya area of Tokyo near other popular U.S. brands, the casual dining restaurant has seating for 215 guests and will employ some 120 people. It is run by licensed franchisee T.G.I. FRIDAY'S JAPAN, INC., a joint venture between the Dallas company of the same name, which is a subsidiary of CARLSON RESTAURANTS WORLDWIDE INC., and WATAMI FOOD SYSTEMS CO., LTD. (see Japan-U.S. Business Report No. 352, January 1999, p. 16).

MERCHANDISING

Japan might be trapped in a nearly decadelong slump, but demand for fine jewelry and accessories apparently still is so strong that TIFFANY & CO. plans to inaugurate its 45th outlet in the country. The newest store, scheduled to open in early November, will be located in the Usui Department Store in Koriyama, Fukushima prefecture.

A LEVI STRAUSS & CO. trying to regain momentum in Japan is franchising its Original Levi's Store re-tailing concept. The first such outlet, which carries Levi's-brand jeans, shirts and the like targeted at teenagers and young adults, is located in the Harajuku section of Tokyo. In time, the San Francisco company could open franchise stores in Osaka and other major cities. Interestingly, none of the company's three directly owned stores are located in the capital. That could change, Levi Strauss says, if the franchised shop is a success.

NONELECTRIC MACHINERY

With the high-end SLA 7000 Production SolidImager from 3D SYSTEMS CORP. shipping (see Japan-U.S. Business Report No. 354, March 1999, p. 21), exclusive distributor INCS CORP. now can offer manufacturers of all sizes and budgets a solid imaging system that will enable them to quickly and cost-effectively make accurate, detailed parts and prototypes. The SLA Series includes four models, ranging from the entry-level SLA 250 through the SLA 7000. With this lineup and the aggressive pricing strategy that it has adopted, Kawasaki, Kanagawa prefecture INCS, which also installs and services Valencia, California 3D Systems' equipment, hopes to sell 35 SLA Series machines in 1999 versus the 25 delivered last year.

DRYVAC ENVIRONMENTAL, INC., the developer of a dewatering technology for waste treatment and disposal, has licensed its technology to a Matsuto, Ishikawa prefecture company. The agreement gives the Japanese firm not only access to the Rio Vista, California company's technology but also allows it to manufacture the system. That could start as early as 2000, although the licensee first will import equipment for demonstration purposes. The DryVac filter-press know-how enables sludges and other products to be dried to 100 percent solids in conventional presses without any additional equipment. As a result, solid volumes and weights can be reduced by anywhere from 50 percent to 80 percent more than traditional processes for dewatering sludge in about the same time and at a competitive cost.

A new, high-efficiency gas turbine engine from ROLLS-ROYCE ALLISON, INC. (formerly Allison Engine Co.) that generates up to 10,400 kilowatts of power per hour has given HITACHI ZOSEN CORP. additional options for designing cogeneration systems. The Allison 601-K11 is the largest gas turbine marketed by the Japanese company, which also distributes the midrange Allison 601-K9 gas turbine for generator sets. Indianapolis-headquartered Rolls-Royce Allison says that both lightweight, modular products incorporate technological enhancements that improve performance, durability, reliability, cost and emissions.

PHOTO EQUIPMENT AND COPIERS

Seemingly determined to cover all price points and levels of sophistication in the **digital** camera market, EASTMAN KODAK CO.'s subsidiary is marketing a model for beginners that is 35 percent smaller than any other **digital** camera it has offered. The aluminum-encased DC215 Zoom **Digital** Camera features a 1-million-pixel CCD for crisp, vivid color pictures and a 2X wideangle zoom

lens for close-ups. It also has a 1.8-inch color LCD that lets users preview and review pictures. Including a PC connection cable and image-processing software, the DC215 Zoom has an estimated street price of \$350.

PRECISION AND MEDICAL EQUIPMENT

Although details are scarce, CATAPULT COMMUNICATIONS of Mountain View, California has made the first sale of its software-based test system for third-generation or wideband CDMA (codedivision multiple access) wireless protocol telephony products. The buyer is FUJITSU, LTD. 3G is a next-generation wireless technology that is expected to deliver wireless voice services with the same quality levels of wireline telephony. That capability will bring the speed and the capacity needed to support multimedia and high-speed data applications.

HEWLETT-PACKARD JAPAN LTD. has added a third model to the Infiniium line of oscilloscopes. The 1-GHz HP 54835A fills the gap between a 500-MHz model and a 1.5-GHz model and gives electronics firms designing **digital** circuitry in the 500-MHz to 1-GHz band-width range a lower-priced alternative to using the \$35,400 system for applications requiring 1.5 GHz of bandwidth. The new Infiniium product, which offers as many as four channels operating at 1 GHz and sampling rates up to 4 GSa/s, lists for \$25,300. With the expanded line, HP Japan expects to sell 1,000 Infiniium oscilloscopes a year.

An ultra-high-speed video recording system that can record up to 4,500 full frames per second or as many as 40,500 pictures per second in partial frame mode is on the market from EASTMAN KODAK CO.'s subsidiary. Developed by the company's San Diego, California Motion Analysis Systems Division, the KO-DAK EKTAPRO HS Motion Analyzer Model 4540 is designed for the analysis of extremely rapid events, such as airbag deployment. Equipped with an electronic memory, the system can store a maximum of 5,120 full frames or a tops of 81,920 pictures for instant replay. Later, the stored images can be downloaded to standard videotape for future reference. Kodak priced the motion analyzer from \$136,300.

The first product line introduced in Japan since EASTMAN KODAK CO. bought IMATION CORP.'s medical imaging business last December is the KODAK DRYVIEW family of laser imaging systems for medical films. The five models making up the line can be configured to print images directly from almost any imaging modality. Alternatively, the modality images can be converted to the DICOM format and sent over a network for fast, affordable printing. The KODAK DRY-VIEW Laser Imagers also automate the quality-control process.

In a further realignment of its business in Japan (see Japan-U.S. Business Report No. 359, August 1999, p. 22), the GE Medical Systems unit of GENERAL ELECTRIC CO. reportedly will give SUMITOMO HEAVY INDUSTRIES, LTD. the **rights** to make and market its compact, high-speed accelerators for positron emission tomography diagnostic imaging systems. SHI, which is a leading maker of accelerators, also will sell equipment supplied by GE Medical Systems for preparing agents that hospitals use for diagnostic imaging.

The pending Japanese partner anticipates that the arrangement will triple its PET-related sales to \$26.6 million a year. What effect the relationship with SHI will have on the business of GE-YOKOGAWA MEDICAL SYSTEMS, LTD., the marketer of GE Medical Systems' diagnostic equipment, is not clear.

THERMO CARDIOSYSTEMS INC. - the developer of the first FDA-approved implantable heart-assist system designed to allow heart-transplant candidates to return home while waiting for a donor heart - has given NISSHO CORP. marketing **rights** to the electric HeartMate left-ventricular-assist system. Now that surgeons in Japan have started to perform organ transplants, Nissho expects a market to develop for the Wo-burn, Massachusetts manufacturer's product. The big maker of medical consumables could begin clinical trials of the HeartMate before yearend. It aims to import and market it within a year or two.

The Health and Welfare Ministry cleared for commercial release

MEDTRONIC, INC.'s GFX2 coronary stent system for use in the treatment of coronary artery disease. The product features several improvements over its predecessor, the GFX.MHW also approved for use SPINAL CONCEPTS, INC.'s titanium BacFix thoracolumbar spinal fixation system, which provides temporary stability to the thoracic, thoracolumbar or lumberspine from T1 to S1. The Austin, Texas company says that its system has several advantages over typical thoracolumbar spinal systems, headed by the elimination of any intraoperative assembly. KOTOBUKI IKA SHOJI CO., LTD., an Osaka-based distributor of ortho- pedic implants, will market BacFix.

Alameda, California-based INSITE VISION INC. gave exclusive manufacturing and marketing **rights** to its AquaSite sustained-release dry-eye treatment to SSP CO., LTD. The Tokyo pharmaceutical company expects production to begin by early 2000. InSite sees Japan as a key market for its particular area of expertise: genetically based glaucoma diagnostics and treatment.

The world's number-two provider of integrated dialysis services for people suffering from chronic kidney failure is moving into the Japanese market. As a first step, TOTAL RENAL CARE HOLDINGS, INC., which owns and operates freestanding kidney dialysis centers and home peritoneal dialysis programs across the United States as well as in some other countries and provides acute hemodialysis services to patients at some 330 hospitals, has set up a Tokyo subsidiary and initiated discussions with a number of hospitals about taking over their dialysis operations. More immediately, the Torrance, California company hopes by yearend to have two of its own dialysis centers functioning. Total Renal Care reportedly is the first foreign company to attempt to provide medical services in Japan.

A second American company has set its sights on Japan's domestically controlled syringe market, although the specific targets of the two differ. BAXTER INTERNATIONAL INC.'s subsidiary is going after 10 percent of sales of syringe pumps, which deliver precise amounts of infusions to patients. The Deerfield, Illinois company's initial entry is the Auto Syringe AS50 Infusion Pump. Able to deliver intravenous solutions, drug solutions and whole or packed red blood cells in neonatal, anesthesiology and critical-care situations, the pump accepts syringe sizes ranging from 1 milliliter to 60 mL. The AS50 costs \$3,500. For its part, BECTON DICKINSON AND CO. is trying to create a demand for prefillable syringes (see Japan-U.S. Business Report No. 359, August 1999, p. 22).

SEMICONDUCTORS

The world semiconductor industry has been in a constant state of flux over the last two years or so, with new production alliances being forged just as long-standing ones are dissolved. By the end of 2000, the latter category will include the Sendai, Miyagi prefecture wafer-fabrication venture between MOTOROLA INC. and TOSHIBA CORP. The big American chipmaker has agreed to buy out its equal partner in TOHOKU SEMICONDUCTOR CORP. on terms that were not disclosed. The company, now capitalized at \$44.2 million, was formed in 1987 primarily to give the two access to each other's technical strengths: DRAMs for Motorola and microprocessors and other logic devices for Toshiba. Memory production ended in 1997 after Motorola decided to exit the DRAM business. Since then, both of TSC's front ends have been used for logic products, which currently include microcontroller units, flash-embedded MCUs and DSPs (**digital** signal processors). Toshiba apparently decided that it had derived all the benefits from the manufacturing tie-up that it could achieve and initiated talks with Motorola about the future of TSC. After the firm becomes a wholly owned Motorola subsidiary, it will make **Digital DNA** embedded processors, which are used in consumer, networking and computing, transportation and wireless communications applications. Motorola says that none of Tohoku Semiconductor's 1,400-plus jobs will be lost. In fact, Motorola is in the process of integrating its Japan semiconductor operations in the Sendai area. About 60 percent of the 1,000 people who work for NIPPON MOTOROLA LTD.'s semiconductor division are being transferred there, including R&D staff. In a totally unrelated

decision, Toshiba recently agreed to buy out IN-TERNATIONAL BUSINESS MACHINES CORP.'s half interest in a Virginia DRAM wafer manufacturing venture (see Japan-U.S. Business Report No. 359, August 1999, pp.8-9).

ON SEMICONDUCTOR, L.L.C., the world's largest maker of discrete, standard analog and standard logic semiconductor components, is the newest player in Japan's semiconductor market. The Phoenix, Arizona-headquartered company was formed in August when TEXAS PACIFIC GROUP bought part of MOTOROLA INC.'s semiconductor business. ON Semiconductor is the trade name of SCG HOLDINGS CORP. Its new Tokyo sales, marketing and customer-support subsidiary goes by the name of SCG JAPAN LTD. Among ON Semiconductor's far-flung manufacturing locations is a wafer-fabrication complex in Aizu, Fukushima prefecture that Motorola opened in 1980 to make logic and memory products.

Four midsize American chipmakers also have moved into the Japanese market, all by tying up exclusively with NIHON DENKEI CO., LTD. This Tokyo company, a marketer of electronic measuring instruments, is representing: ANALOG MICROELECTRONICS, INC. of Santa Clara, California, which specializes in analog chips for measuring equipment; AUSTIN SEMICONDUCTOR, INC., an Austin, Texas supplier of high-reliability memory products and memory modules for the space and military industries; Sunnyvale, California-based CERMETEK MICROELECTRONICS, INC., which provides chips for modems; and neighbor IMPALA LINEAR CORP., a maker of DC/DC converters for mobile phones and other communications products. Nihon Denkei believes that each of the four company will have local sales of anywhere from \$885,000 to \$1.8 million the first year.

For its part, market newcomer DVDO, INC. named MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD. to distribute its line of video-processing ICs to manufacturers of **digital** TVs, projection systems and flat-panel displays. The Campbell, California firm's newest product, the DV101 Image Enhancement Engine, incorporates its PureProgressive video-enhancement technology. It will be the first DVDO chip that MEI handles. The part will be marketed to makers of **digital** TV, LCD, plasma, DLP (**digital** light processing) and other progressively scanned display devices.

In conjunction with its stronger emphasis on Asian sales, RADISYS CORP., a supplier of Intel-based em-bedded chipsets, signed ASAHI ELECTRONICS CO., LTD. and OKAYA ELECTRONICS CORP. to market its products to OEM customers in the communications, industrial automation and other fields. Both companies already distribute INTEL CORP. processors and associated parts. Hillsboro, Oregon RadiSys has a subsidiary in Yokohama.

The fastest Pentium III processor that INTEL CORP. has developed is shipping to computer manufacturers in Japan as well as in the United States. The 600-MHz version of the chip is designed to deliver the full power and richness of the Internet to Web surfers as well as to enhance such business applications as e-commerce, data visualization, streaming audio, video and speech recognition. In the United States, the 600-MHz Pentium III with 512 KB of L2 cache costs \$670 each in quantities of 1,000 units. The high-end processor now is available in speeds of 450 MHz, 500 MHz, 550 MHz and 600 MHz.

In another worldwide release, INTEL CORP., which claims the title of the world's top maker of flash memories, announced the 3-Volt Intel StrataFlash with triple the read performance of its predecessor. The result of 0.25-micron processing technology, the part enables both code execution and data storage on a single, high-density 128-megabit chip. The 3-Volt Intel Strata-Flash also is said to offer the most storage in a NOR-type flash device. These capabilities give new design options to manufacturers of handheld devices, smart phones, PC companions, networking equipment, set-top boxes and other Internet-connected appliances. Volume shipments of 128-Mb 3-Volt Intel StrataFlash parts were set for September at U.S. prices of \$29.90 each in 1,000-unit quantities. In the first quarter of next year, Intel is scheduled to introduce 32-Mb and 64-Mb versions of the new part.

Users of SUN MICROSYSTEMS, INC.'s 3000 to 6500 Enterprise servers now

can double the top factory-installed system memory of these Unix products, thanks to the 2-GB DRS702/2048 memory board from DATA-RAM CORP. The Princeton, New Jersey manufacturer selected COMPUTER DYNAMICS CORP. to market the \$14,800 product. The Tokyo distributor thinks that it can sell 1,000 boards a year to the substantial number of Sun installations in Japan.

SIRF TECHNOLOGY, INC. - a developer of chipsets that deliver the locational benefits of GPS (global positioning system) technology to wireless hand-held products, car navigation systems, PC-based platforms and consumer devices - has licensed its intellectual property to two more Japanese companies. NTT MOBILE COMMUNICATIONS NETWORK, INC. will integrate the Santa Clara, California company's just-announced SirFLoc know-how into its DoCoMo

Location Platform. SirFLoc is a platform-specific technology that improves GPS location capabilities in wireless systems. At the same time, AISIN AW CO., LTD. incorporated SirF's GPS architecture into its line of car navigation systems.

In another design win for an American company, the PM-44+ iDSP from OAK TECHNOLOGY, INC. is the imaging solution for select scanners and **digital** copiers introduced by FUJITSU, LTD. and HITACHI KOKI CO., LTD. Fujitsu integrated the Andover, Massachusetts company's part into its M3090 series of departmental and production scanners, while Hitachi Koki used the chip in its DDS32 **digital** copier, the company's first such product. Oak Technology's iDSP family is said to represent the only line of DSPs designed specifically for **digital** imaging equipment. It combines high image-processing throughput rates with the flexibility of a programmable DSP architecture.

HEWLETT-PACKARD JAPAN LTD. named MACNICA, INC. to distribute a pair of CMOS color image sensors with **digital** output and timing controller for such applications as PC cameras, **digital** still cameras and surveillance and security video cameras. The difference between the two sensors is the array size: 640 x 480 (the HDCS-2000) or 352 x 288 (the HDCS-1000). Both are said to offer excellent image quality with low power consumption.

With technical input from SONY CORP., the promoter of the Direct Stream **Digital** format for Super Audio CD players, BURR-BROWN CORP. developed the DSD1700. It is the Tucson, Arizona manufacturer's first DSD audio **digital**-to-analog converter. In combination with Sony's DSD decoder, the part will deliver the high performance and the sound quality that DSD technology promises. Sampling of the DSD1700 will start later this year. It is targeted to be priced at \$14.50 per unit in quantities of 100.

In a somewhat surprising move, AMERICAN MI-CROSYSTEMS, INC., a Pocatello, Idaho supplier of mixed-signal ASICs (application-specific ICs) and other semicustom mixed-signal devices, outsourced assembly and testing of certain plastic-packaged parts to FUJITSU VLSI, LTD. The deal marks the first time that the wholly owned FUJITSU, LTD. company has won a contract from a company outside the Fujitsu Group. Fujitsu VLSI will handle back-end processes for roughly 10,000 AMI chips a month at its facility in Gifu prefecture. AMI, a JAPAN ENERGY CORP. company, will do final inspection.

Under an arrangement that will expand the availability of TESSERA INC.'s chip-scale packaging, especially in Japan, the San Jose, California company licensed its Micro BGA (ball-grid array) technology to NORTH CORP. The agreement specifically covers the Tessera Compliant Mounting Tape technology, which is used in the assembly of Micro BGA packages. North will provide the tape to Tessera contract assembly licensees that make the package.

Effective September 1, the complete product portfolio of the Eaton Semiconductor Equipment Operations unit of EATON CORP. will be represented in Japan by SUMITOMO HEAVY INDUSTRIES, LTD. Last April, Beverly, Massachusetts-based Eaton Semiconductor gave SHI the job of selling, distributing, servicing and supporting its thermal processing equipment

line. Now, it has transferred responsibility for sales and support of its resist-strip and photostabilization equipment to SHI from TOKYO ELECTRON LTD. This centralization is a natural extension of the 15-year, Toyo, Nagasaki prefecture- based production and marketing joint venture between Eaton Semiconductor and Sumitomo Heavy Industries on the Eaton Nova line of ion implantation equipment.

APPLIED MATERIALS, INC., the world's largest supplier of wafer fabrication systems, has introduced two more products in Japan. One is the SiNgen Centura, a single-wafer, low-pressure chemical vapor deposition system for depositing critical silicon nitride film layers in the transistor structures of 0.18-micron and smaller devices. The Santa Clara, California manufacturer notes that SiN films have an increasingly significant impact on chip performance as line geometries move below 0.18 micron. The \$2.7 million or so SiNgen Centura combines Applied Materials' production-proven, single- wafer xZ chamber technology and Centura platform with a state-of-the-art nitride deposition system. The second new product is the Mirra chemical mechanical polishing system with its throughput of more than 50 wafers an hour. The Mirra, which also costs about \$2.7 million, features the Titan Head wafer-polishing carrier. It rotates the wafer during the polishing process and, according to Applied Materials, provides uniformity and repeatability among wafers. The other strength of the Mirra, the company says, is technology that detects film thickness changes during polishing. This capability allows the user to precisely define material removal and, thus, the process endpoint.

SOFTWARE AND INFORMATION SERVICES

With forecasts showing that half of all Web surfers in Japan will be women by 2003, WOMEN.COM NETWORKS, INC. hopes to mine this potentially rich market. Already the top Internet destination for women in the United States, the San Mateo, California company has teamed up with MITSUI COMTEK CORP. to translate existing Women.com content into Japanese for uploading **under license** to the Living Ladies Community site run by SANKEI LIVING SHIMBUN INC. The combination offers Japanese women the depth of Women. com's coverage of women's issues and the local perspective of Sankei Living and Mitsui Comtek through their contributions of unique material.

Even before the launch of its Internet store for new cars and light trucks (see Japan-U.S. Business Report No. 358, July 1999, p. 25), AUTOBYTEL.COM INC.'s subsidiary has formed a partnership with RECRUIT CO., LTD., AUCNET INC. and GULLIVER INTERNATIONAL CORP. in preparation for selling used vehicles on-line. The virtual used-car lot is expected to open in spring 2000; new car sales will start in November. Buyers will complete an on-line form detailing exactly what they are looking for in a used vehicle. The Autobytel operation then will forward the request to the participating dealer closest to the customer, who will be contacted by e-mail.

Hoping to tap the bargain-hunting side of Japanese Web surfers as well as their pocketbooks, EBAY INC. has signed a deal with NTT-ME INFORMATION XING, INC. to provide access to its on-line auction system via the NIPPON TELEGRAPH AND TELE-PHONE CORP. subsidiary's Goo Web portal. Goo already attracts 10 million page hits a day, making it the number-two portal in Japan. NTT-X expects access to San Jose, California-based eBay's auction system to boost this number. This is eBay's initial entry into the Japanese market.

To support the rapidly expanding volume of on-line commerce, makers of back-end payment systems are showering the market with new products. For example, ECHARGE CORP. has opened a wholly owned subsidiary in Tokyo to sell and support its no credit-card settlement system. eCHARGE adds on-line shop-ping charges to existing monthly bills, such as for telephone service. Officials of the Seattle company claim that their system reduces the chance of credit-card information falling into the wrong hands, a marketing thrust that should play well with Japanese consumers. The eCHARGE subsidiary plans to sign business alliances with operators of virtual shops and malls,

including NIPPON TELEGRAPH AND TELEPHONE CORP. The world leader in back-end e-commerce services, CYBERCASH, INC., is not taking it easy. It has added MITSUI & CO., LTD. to the list of 11 Japanese firms backing its technology and Tokyo-based subsidiary. The trading company invested \$1.3 million in the CyberCash affiliate for a 10 percent stake. It ranks as the third-largest investor in the operation, which was formed in April 1997, after the Reston, Virginia company's parent (40 percent) and SOFTBANK CORP. (16 percent). Mitsui will help CyberCash market its real-time credit-card payment processing services.

A third pair in this market segment - HEWLETT-PACKARD JAPAN LTD. and NEC CORP. - has finished codeveloping a virtual point-of-sale program and launched a combined marketing effort (see Japan-U.S. Business Report No. 354, March 1999, p. 24). vPOS 4.5J is written entirely in Japanese. It can handle a wide variety of demands, everything from single stores (\$5,400) to unlimited on-line Internet malls (\$31,600). Together, HP Japan and NEC expect to sell 200 copies of the package in the first year. VERIFONE, INC., a HEWLETT-PACKARD CO. company, is the originator of vPOS.

VALUECLICK INC., the pioneer in pay-per-click Internet advertising, is so pleased with its nascent Japanese sales initiative that it has taken ownership control of its 15-month-old joint venture and plans further international expansion. While upping its stake in the subsidiary to 54 percent from 32 percent by buying shares from JAFECO CO., LTD., the Carpinteria, California company retained its marketing partnership with TRANS PACIFIC LTD. (see Japan-U.S. Business Report No. 348, September 1998, p. 16). ValueClick's Japanese unit hopes to target Web site operators in other Asian countries, offering localized, turnkey Internet advertising solutions.

Irvine, California-based WEBZTER CORP. has similar Asia-focused expansion plans. The high-end Web site/e-commerce developer has opened offices in Tokyo as well as in Hong Kong and Singapore. The Tokyo facility, which also will service South Korea, plans to sell a full line of Internet consulting services. These range from corporate reengineering for Internet-based operations and Internet media buying programs to Web site design and development.

To boost sales and use of its MP3-based on-line music distribution and play software, LIQUID AUDIO, INC. licensed its know-how free of charge to MITSUBI-SHI ELECTRIC CORP., SANYO ELECTRIC CO., LTD. and TOSHIBA CORP. for incorporation into their portable **digital** music players. The Redwood City, California firm's SP3 program handles the downloading of music from the Web while preventing illegal copying of protected **digital** works. Liquid Audio moved into the Japanese market last September (see Japan-U.S. Business Report No. 349, October 1998, p. 22).

A global leader in engineering know-how, ENGI-NEERING INFORMATION INC., plans a fully localized version of its award-winning Internet site for architectural and construction services. Japanese engineers will have access from their desktop to a huge pool of archived and current information, including Ei's Compen-dexWeb engineering **data** base, 40 **other** engineering-related **data** bases, 30,000 relevant Web sites, patent and standards information, current product catalogs and the full texts of engineering journals and articles deliverable via Internet fax. The Japanese version of Engineering Information Village will go live in October.

Westport, Connecticut-based INTERNET.COM CORP. has brought its information resources for the Internet industry and Internet technology professionals to Japan. With the help of Tokyo's COMMUNICATION ONLINE INC., internet.com launched the japan.internet.com Web site. It provides entirely in Japanese the latest news and editorial content on the rapidly evolving Internet business. The partners hope to attract local advertising yen by offering space on the site's 45 e-mail newsletters, 55 on-line discussion forums and 52 moderated e-mail discussion lists.

The subsidiary of Internet hardware giant CISCO SYSTEMS, INC. has completed shifting all its customer support services to the Internet. The

SmartNet service provides periodic software upgrades and 24x7 remote troubleshooting to purchasers of Cisco's switches and routers. The service goal is to diagnose problems within one day of receiving a request and then, if needed, to dispatch support personnel from one of the more than 100 Japanese companies with which Cisco works.

Software developed by CENTRA SOFTWARE, INC. that powers on-line learning and business collaboration is now available from MACNICA, INC. The Lexington, Massachusetts firm's Centra 99 is used by more than 150,000 companies worldwide. It has become the de facto standard for conducting business-to-business events over the Internet. Tokyo-based Macnica not only is selling Centra 99 but also offers after-sale support, training and localization services.

With the explosion of local interest in getting information on-line, STARBURST SOFTWARE has tied up with HITACHI INFORMATION TECHNOLOGY CO., LTD. to offer a complete content-distribution solution. The Concord, Massachusetts firm and the HITACHI, LTD. subsidiary will market, sell and support StarBurst Software's OmniCast product, which can simultaneously broadcast content via the Internet to thousands of recipients. Moreover, because it works seamlessly with existing intranets/extranets, OmniCast is simple to install, integrate and operate.

The booming Japanese market for handheld, Inter-net- capable communication devices also is attracting more foreign interest. For instance, SPYGLASS INC. licensed its Internet content-delivery platform for hand-helds to SEIKO EPSON CORP. for use in a new generation of cellular telephones. The Naperville, Illinois firm's SpyglassPrism proxy server not only provides a full range of telephone functions but also includes a Web browser, information directory, a road map **data** base and **other** personal information services. Spyglass-Prism automatically identifies the device requesting information, then dynamically reformats the desired content to fit the handheld's small screen.

Following its acquisition of PROXINET, INC. of Emeryville, California, PUMA TECHNOLOGY, INC. is offering a competing product but one with a slightly different thrust. By combining its Intellisync synchronization package with ProxiNet's proxy-based data and content transformation software, Puma Technology's package reformats information on the fly for small handheld devices, just like SpyglassPrism. Intellisync, however, automatically and efficiently ensures that data files stored on remote servers and on the personal device are identical. The subsidiary of San Jose, California Puma Technology is marketing the integrated product. With the broader market for intelligent TV-related devices in mind, ORACLE CORP.'s local arm is offering Liberate Connect ISP Suite 1.5J. Licensed from Red-wood Shores, California-based LIBERATE TECHNOLOGIES (see Japan-U.S. Business Report No. 357, June 1999, p. 11), the package helps ISPs manage the deployment and the support of set-top boxes, game consoles, Internet TVs and embedded Internet devices. For prices starting at \$153,100 for 500 users, the software allows ISPs to deliver value-added services to customers using existing network architectures and front-end/back-end software. As a companion, Oracle's subsidiary is selling Liberate TV Card SDK 1.1J, a \$15,900 software development kit for the network interface card.

IBM JAPAN LTD. has rolled out a new version of its popular talking Web browser, Home Page Reader. The \$130 Japanese-language package reads Web pages aloud as they are downloaded, enabling visually challenged people to surf the Internet without special equipment. The latest edition includes a headline reader, fast-forward and jump-forward commands and full support for sending and receiving e-mail.

Targeting the large number of Japanese firms that want to contract out their e-mail system needs, CRITICAL PATH, INC. has teamed with MITSUI & CO., LTD. The trader will localize and exclusively market the San Francisco company's contract e-mail services, which run from the very basic to the highly customized. INFORMATION RESOURCE ENGINEERING, INC.

announced that NOMURA RESEARCH INSTITUTE, LTD. has bought more of its secure business communications software and services. IRE provided its SafeNet/Trusted Services VPN (virtual private network) package for NRI's secure extranet system, which connects more than 13 brokerage houses for electronic trading communications. Since last year, NRI has protected its intranet with IRE's SafeNet/Security Center VPN software. The Baltimore company provides a complete solution, including design, implementation, operation and technical support.

ENCOMMERCE, INC.'s recently established subsidiary added NETONE SYSTEMS CO., LTD. as its third marketing partner (see Japan-U.S. Business Report No. 357, June 1999, p. 24). Demand for enCommerce's getAccess Web portal access-management software has been stronger than expected, leading the Santa Clara, California firm to bolster its marketing team. The package allows administrators to discourage unauthorized Web browsing and adds another layer of security.

WATCHGUARD TECHNOLOGIES, INC. is finding a ready market in Japan for its Internet broadcast security products. On the heels of landing a contract from INTERNET INITIATIVE JAPAN INC. (see Japan-U.S. Business Report No. 359, August 1999, p. 27), the Seattle business announced that SOFTBANK CORP. and FUJI XEROX CO., LTD. would join its family of distributors. The WatchGuard LiveSecurity System takes a comprehensive approach to protecting networks and transmitted information, including a firewall/VPN module (WatchGuard Security Suite), a centralized management tool (WatchGuard Policy Manager) and an automatic network threat/antivirus update service (WatchGuard LiveSecurity Broadcast Service).

Two new authentication packages are on the market from SECURITY DYNAMICS TECHNOLOGIES, INC.'s subsidiary for its SecurID system. Token 2.0, which costs \$355 for a 10-user license, generates single-use passwords to verify users while a network is being serviced or upgraded. That capability provides secure access during a period when normal protections may not be operating. For its part, ACE/Server 4.0 controls access to networked applications by authenticating users. A 25-user license for this program is \$6,400. With just weeks to go before January 1, 2000 arrives, MICROSOFT CORP.'s subsidiary released a Japanese-language version of the dominant PC operating system. Windows 98 Second Edition not only includes greater integration of Internet functions (Internet Explorer 5.0) and multimedia tools (Windows Media Player) but also readies PCs for the date rollover to the new millennium. A full version lists for \$220, while an upgrade from earlier versions of Windows is likely to go for \$120. Users of the original edition of Windows 98 need only pay about \$9.00 for a CD-ROM of the up-grade.

HEWLETT-PACKARD JAPAN LTD. is giving users of its Internet Advisor protocol analyzer that have purchased service contracts a free piece of software to detect Year 2000 issues in their HP equipment. Y2K Commentator analyzes user data and user-defined protocols in real time, looking for potential problems that might develop when 2000 starts. The package not only detects potential issues but offers repair recommendations.

Software developed by BASIS TECHNOLOGY CORP. has allowed LYCOS, INC. to fully localize its Japanese Web portal with a minimum of time and effort. The Cambridge, Massachusetts firm's Rosette C++-class library for UNICODE gives most C++ software packages the ability to handle multiple languages. Lycos not only employs Rosette to make Japanese the default language of its Japan Web presence, but the Internet portal operator also uses it to localize its products for the Korean and Chinese markets. Basis Technology is showcasing its work with Lycos to attract other Asian-minded Internet and software companies.

The insatiable demand for information infrastructure management solutions that can deal with mixed networks of legacy and new hardware and software has led INTEL CORP. to expand distribution and service capabilities for its LANdesk products. CORE CORP., a software value-added reseller, will coordinate the recruitment of what are called deployment VARs. These companies provide customers with a network of trained regional

and national technicians experienced in deploying LANdesk products. Core also will sell Intel's family of network analysis and management tools and provide front-line customer service. LANdesk helps customers plan the development and the evolution of their heterogeneous networks as well as handling management functions.

SECURE COMPUTING CORP. of San Jose, California chose NETONE SYSTEMS CO., LTD. to distribute the latest version of its network firewall software. Sidewinder 4.1 takes advantage of advances in processor speeds and architectures, reducing the potential for the firewall to become a bottleneck to network traffic. NetOne Systems priced the package at \$8,700. It hopes to sell 300 packages the first year.

With the takeover of Dallas-based ABIRNET, LTD. finalized, COMPUTER ASSOCIATES INTERNATIONAL, INC.'s subsidiary rolled out the latest version of Abirnet's network surveillance and intrusion detection package. SessionWall-3v1 Release 4 provides reports on network usage, content scanning, intrusion detections, blocking, alerting and logging. It also can monitor and enforce Internet access according to company-set policies and scan the content of e-mail messages to develop a data base to defend against future litigation. Available through FORVAL CREATIVE, INC., the new SessionWall-3 is priced from \$2,700 for a 25-user license to \$26,500 for an unlimited license. Similarly, PICTURETEL CORP.'s marketing unit introduced a package developed by a 1998 acquisition. The StarWorks multimedia streaming package for networks is a product of PictureTel subsidiary STAR-LIGHT NETWORKS, INC. of Mountain View, California. For \$151,300, StarWorks provides a complete set of tools that allow network managers to create and distribute streaming media services, such as videoconferencing, live and interactive multicasting and video on demand. Racing to beat competing products from MICROSOFT CORP., the subsidiary of collaboration leader NOVELL, INC. released a localized version of its GroupWise 5.5 messaging server software. The package not only handles e-mail, appointment **data** and **other** types of messages, but it offers many document management capabilities as well. GroupWise has client packages for PCs running under any version of Windows as well as the Mac OS.

With Japanese executives taking a harder look at how assets contribute to the bottom line, GLOBETROTTER SOFTWARE, INC. is offering a product that improves the return on investments in software. The San Jose, California company's SAMsuite 3.0 provides a central control console to manage software usage over large and complex networks. It also generates software licensing fee **data**, usage reports, bill-back and **other data** that can help companies make the most of their software budgets. GLOBETrotter tapped SOFTWARE RESEARCH ASSOCIATES, INC. to handle the software asset management package. Pricing starts at \$22,100 for a single site license, plus \$3,200 for an annual maintenance contract.

IBM JAPAN LTD. has bolstered its menu of enterprise application integration products by adding ENTERPRISELINK TECHNOLOGY CORP. to its Vendor Logo Product program. The Campbell, California firm and ITOCHU TECHNO-SCIENCE CORP., its marketing partner since March 1998, now can use IBM Japan's huge sales network to promote SmartTran eBusiness EAI solutions. SmartTran already has been deployed by such corporations as DAI-ICHI KANGYO BANK, LTD., NIPPON TELEGRAPH AND TELEPHONE CORP., SHARP CORP. and YASUDA LIFE INSURANCE CO. for internal purchasing networks and currency trading systems.

A competing EAI product from NEW ERA OF NETWORKS, INC. has been selected by SUMITOMO BANK, LTD. to complete the first phase of its Global Information System initiative. The bank will use the Englewood, Colorado firm's NEONet software to enable its applications and data bases to exchange information seamlessly, reducing the cost of its international banking operations. NEONet has been deployed by other top Japanese banks for similar reasons (see Japan-U.S. Business Report No. 349, October 1998, p. 24).

The Japanese unit of ANDERSEN CONSULTING LLP has crafted an enterprise resource planning pack-age that meets the special needs of local governments. With many municipal budgets in the red, authorities are desperate to wring efficiencies from their operations and control their budgets. Andersen Consulting's ERP solution is based on PEOPLESOFT, INC.'s PeopleSoft 7.5 package. The consultant hopes to sign up at least 50 local governments to use its software and services by 2002.

In a powerful pairing, the subsidiaries of STRUC-TURAL DYNAMICS RESEARCH CORP. - the developer of the I-DEAS computer-aided design, manufacturing and engineering package and the Metaphase Enterprise product development management software - and HEWLETT-PACKARD CO. have formed a partnership targeted at the PDM market. They will open a Metaphase Solution Center at SDRC's Tokyo offices that is staffed by employees from both companies with expertise in supporting information management requirements. The center initially will focus on the needs of automotive and electronics customers of SDRC and HP, including their supply chains, offering these manufacturers turnkey PDM solutions that address their business objectives. SDRC, which reportedly controls nearly half of the world PDM market, and HP plan to extend their collaboration in Japan to Europe and even the United States.

To kick-start sales of its newest sales force automation package, SIEBEL SYSTEMS, INC.'s subsidiary will double its work force to 60 by the end of this year. The Menlo Park, California company hopes that this expansion will help to push sales of its Siebel 99.5 SFA package and other products to \$106.2 million in 2000 from a projected 1999 total of \$31 million. Part of this forecast depends on solid sales of a scaled-down version of Siebel 99.5 aimed at companies with less than 100 sales representatives. Both this version and the full-blown one designed for major corporations feature improved e-commerce functions.

Through its subsidiary, TIVOLI SYSTEMS INC. has rolled out a localized update of its customer assistance administration package. Priced from \$41,200, Tivoli Service Desk 5.0.2J allows network managers to provide comprehensive help and other services with distributed resources following centralized policy guidelines. Integrating problem management, asset management and change management modules, the solution tracks customer interactions from start to finish. It uses artificial intelligence to bring the proper resources to bear on customer issues.

SAS INSTITUTE INC. has developed a data ware-house solution specifically for clinical test data. The PH.DataWare package, which its subsidiary has priced at \$66,400, includes PH.Study Manager to apply the clinical study format to warehoused information and to document how **data** are handled and transformed. **Other** components are: PH.Documenter to publish the out-put of PH.Study Manager to an intranet or a document management system; PH.DataPilot to handle complex dependencies to update accurately tables and batch processes; PH.MetaBuilder to provide hooks to external programs for automatically downloading data or meta-data; and PH.Interfaces to act as a gateway between PH.MetaBuilder and **other** clinical **data** management systems. The Cary, North Carolina company's marketing unit believes that it can sell 20 copies of the PH.DataWare package annually.

Market newcomer CAPTIVA SOFTWARE CORP., the leading supplier of forms-processing and document- capture products, has named NISSHO ELEC-TRONICS CORP. as its exclusive distributor. The San Diego, California developer simultaneously released Japanese versions of FormWare and Genesis. Captiva Software is convinced that it is moving into the Japanese market at the right time since domestic firms are interested in automating the now slow and costly manual collection of forms-based information but the availability of forms-processing and document-capture soft-ware is very limited. FormWare handles this task at the enterprise level, while Genesis offers a streamlined feature set for desktop users.

Financial analysis software developed by SS&C TECHNOLOGIES, INC. will power FUJITSU, LTD.'s attempt to enter the market for integrating and

configuring investment management decision systems. Fujitsu will modify the Windsor, Connecticut firm's CAMRA 2000 and Antares 2000 packages to suit Japanese trading practices. Starting in December, it will target its sales pitch to investment advisers, insurance providers and trust banks. Fujitsu expects to price packages incorporating both software and services from \$442,500. The company hopes to land 30 customers within three years. Broadcasting and entertainment businesses in Japan no doubt will be interested in a new enterprise-strength, 3D, **digital** video software package from C-3D **DIGITAL**, INC. The Salt Lake City, Utah company signed an agreement with SOFTWARE TOO CORP. to distribute its complete line of Strata 3D and DV products, which allow broadcasters to deliver 3D entertainment to any standard television by converting two-dimensional films in real time. C-3D **Digital** already is in the programming end of the Japanese market through an arrangement with a company to broadcast its 3D content to premium TV subscribers (see Japan-U. S. Business Report No. 357, June 1999, p. 31). Creating clear, informative business diagrams is the purpose of VISIO CORP.'s upgraded eponymous software. The four editions of Visio 2000 - Standard, Technical, Professional and Enterprise - integrate closely with MICROSOFT CORP.'s Office suite, making it easy to add Visio diagrams to any Microsoft Office document. The Visio 2000 family also is Web-enabled. That allows users to share diagrams over the Internet/ intranet. It also supports Japanese phonetic alphabets and characters. Available through the Seattle company's subsidiary, the localized version of Visio 2000 Standard Edition is priced from \$120 to \$265.

WOLFRAM RESEARCH, INC. released the latest version of its popular Mathematica technical computing package through SUMISHO ELECTRONICS CO., LTD. Mathematica 4 grinds through complex mathematical formulas up to 10 times faster than its predecessor, requires half as much memory and is fully localized for Japan. Sumisho Electronics is promoting the new version of the Champaign, Illinois developer's product by initially offering it at the same price (\$3,200) as the last release. It is eyeing first-year Mathematica 4 sales of 1,700 copies. To date, educational and research organizations have purchased annually some 1,500 copies of earlier Mathematica releases.

Translated versions of two popular MICROSOFT CORP. PC games will be available before the end of 1999. Age of Empires II: The Age of Kings is a strategy simulation that spans the millennium between the fall of Rome and the end of the Middle Ages. Players can choose from 13 cultures to rule and command. Flight Simulator 2000 provides a broader range of simulated aircraft and more realistic graphics.

New on the market from ADOBE SYSTEMS, INC.'s subsidiary is the latest localized version of the industry-standard PhotoShop image-editing program.

Version 5.5 integrates tools to create high-quality images for print or for the Web, reducing the need for other software and providing a unified creative environment for both types of media.Separately, ADOBE SYSTEMS, INC.'s Tokyo marketing unit linked up with MORISAWA & CO., LTD. to support the Osaka firm's Font NewCID software for embedding, displaying and printing Japanese outline fonts. Morisawa's product is compatible with Adobe's Acrobat 4.0, which is widely used to create documents that can be displayed regardless of hardware and software differences.

Through its subsidiary, STRUCTURAL DYNAMICS RESEARCH CORP. is offering updated CAD products targeted at both the high end of the market and the middle. Gateways that allow the pair of 3D CAD products to collaborate with other software packages have been added to make them integral parts of supply chain management solutions. The two also have been Web-enabled for the Internet and corporate intranets. I-DEAS Master Series, Release 7, which starts at \$12,400, and I-DEAS Artisan Series, Release 4, are available through INFORMATION SERVICES INTERNATIONAL-DENTSU, LTD., SDRC's longtime distributor. ISID is projecting combined sales of the two packages

at 1,200 copies a year.

Palo Alto, California-headquartered ECHELON CORP. has teamed with YOKOGAWA ELECTRIC CORP. to promote worldwide the use of its LonWorks open-standards manufacturing control software. YOKOGAWA M&C CORP. will develop a full line of Lon-Works- compatible sensors, actuators and controllers, which its parent then will integrate and deploy in its manufacturing execution integration services. The Yokogawa Group hopes to generate \$88.5 million in Lon-Works- related sales over the next five years. As part of the arrangement, Yokogawa Electric joined the Lon-Mark Interoperability Association as a sponsor, the first Japanese company to join at this top membership level. However, a number of Japanese firms are authorized integrators of Echelon's facilities control network software and hardware (see Japan-U.S. Business Report No. 355, April 1999, p. 32).

At an undisclosed price, MENTOR GRAPHICS CORP. and distributor ITOCHU TECHNO-SCIENCE CORP. have completed delivery and installation of a new hardware simulator system at multiple MITSUBI-SHI ELECTRIC CORP. sites. The giant electronics maker will use Mentor's Celaro hardware emulator to develop its next generation of large-scale system-on-a-chip designs. It anticipates that Celaro's established architecture will reduce verification time from weeks to days and also cut design cost on a scale of million of dollars per project.

Electronic design automation software developer ALDEC, INC. has tapped ASSETCORE TECHNOLOGY K.K. and ZYCAD TSS K.K., both of Yokohama, to distribute and support the three configurations of its Active-HDL tools. The Henderson, Nevada company's Active-HDL 3.6 VHDL tools are used to design field-programmable gate arrays. They are priced from \$4,800 (Standard Edition) to \$19,900 (Expert Edition).

A new signal-processing EDA tool for next-generation cellular phones, **digital** cameras and high-definition TVs is available from CADENCE DESIGN SYSTEMS, INC.'s subsidiary. Ciertos automatically converts specification and design data into standard circuit-design languages, completing in a few hours a task that takes weeks manually. The program also has modules that simplify the design of wideband CDMA cell phones and MPEG-2 decoders. Ciertos pricing begins at \$99,600.

Japanese makers of high-end consumer electronics products will receive a new product pitch from VERI-BEST, INC. and exclusive marketing partner CADIX INC. (see Japan-U.S. Business Report No. 355, April 1999, p. 31). They have taken the Boulder, Colorado firm's high-speed, high-density Expedition PCB (printed circuit board) design package and modified it to meet the special needs of local customers. Expedition's ability to shorten the design process, VeriBest and CADIX believe, can help manufacturers keep up with rapid changes in the consumer electronics market.

In what no doubt will give a boost to communications software developer TCSI CORP.'s Japan marketing efforts, the Alameda, California firm and NIPPON TELEGRAPH AND TELEPHONE CORP. have completed installation of an ATM (asynchronous transfer mode) control network for an unnamed government agency. Using TCSI's SolutionCore communications applications platform, NTT developed a highly scalable, robust ATM network management system in just six months. The SolutionCore variant, codenamed Champion V3R2, manages a broadband network composed of a fabric of ATM switches from several vendors.

TELECOMMUNICATIONS

Internet and data communications traffic is straining capacity all along the network, including what is called the backhaul segment. A company to be formed by PACIFIC GATEWAY EXCHANGE, INC. and KDD SUBMARINE CABLE SYSTEMS INC. will tackle part of that bottleneck by building backhaul circuits between the landing stations in coastal Japan for undersea fiber-optic cable networks and major metropolitan centers and selling this capacity to communications carriers.

The partners will employ a new architecture for back-haul networks by locating the cable terminating equipment in a specific city rather than at a cable landing point. This arrangement, say PGE and KDD-SCS, should result

in a big cut in facility costs while also improving transmission and service quality. The joint venture, in which the Burlingame, California partner will be the majority (51 percent) owner, initially will install backhaul circuits between cable landing stations in Kanagawa and Chiba prefectures and central Tokyo. This work is scheduled to be completed by mid-2000. Pacific Gateway was among the first foreign communications carriers to receive a Type I license from the Ministry of Posts and Telecommunications (see Japan-U.S. Business Report No. 351, December 1998, p. 26).

Two months ahead of schedule, AT&T CORP. and BRITISH TELECOMMUNICATIONS PLC completed their strategic and operational partnership with JAPAN TELECOM CO., LTD. (see Japan-U.S. Business Report No. 356, May 1999, p. 30). In the biggest investment to date by foreign competitors in Japan's huge communications market, they acquired a combined 30 percent stake in the third-largest long-distance carrier at a cost of some \$1.8 billion. Japan Telecom then turned around and took over AT&T's in-country data communications business, AT&T JENS CORP., as well as BT's communications services and network information services.

The deal strengthens Japan Telecom's ability to deploy new services and technologies to its customers. More importantly, it gives AT&T and BT an established, nationwide channel to deliver the branded services of their international joint venture to multinational business customers and international carriers. The timing of the launch of those services hinges on U.S. regulatory approval.

Corporations and other high-volume telephone users have another choice in international services providers. Through its Hong Kong subsidiary, GTE CORP. began offering low-cost, flat-rate connections September 1 by leasing capacity from other carriers between Hawaii and Japan that is tied into publicly switched networks on both sides of the Pacific. GTE is charging 43 cents for a three-minute Japan-U.S. call at any hour of the day or night. That represents a savings of 80 percent over KDD CORP.'s daytime rates, for instance.

PSINET INC. made headlines in the business press last year by using acquisitions to become Japan's number-two ISP for corporate accounts (see Japan-U.S. Business Report No. 350, November 1998, p. 27). Now, the Herndon, Virginia company, which bills itself as the world's first and largest independent commercial ISP, has announced several initiatives designed to provide a complete Internet solution to its Japanese business customers. The starting point of this push is wholly owned PSINETWORKS JAPAN INC.'s recently received Type I license, which will allow the extension of PSINet's facilities-based IP network. Once the Japan-U.S. Cable Network becomes operational in mid-2000, the company, which has capacity on this undersea fiber-optic system, will use its operating authority to provide high-speed communications networking services to customers in Japan and elsewhere in Asia. In the interim, PSI-Net has committed as much as \$265.5 million to build three Internet hosting centers in Japan, each with the capacity to house 5,000 servers. The 43,000-square-foot Tokyo Global Hosting Center is scheduled to open in mid-October. Equipped with its own power-generating system and designed to withstand an earthquake of the same magnitude as the 1995 Great Hanshin Earthquake, the facility will provide large-scale, high-reliability, fully managed services to other carriers and ISPs. Within the next two years, a second Internet hosting center will be built in the Tokyo area as well as one in the Kansai region. Moreover, by the end of September, PSINet-works Japan will introduce an economy service plan to corporate subscribers located within about nine miles of one of its Internet access points. Customers that sign up for this package will pay \$3,000 a month, including \$1,400, about half the normal charge, for fast (1.5 mega-bit per second) Internet access and the rest for the use of dedicated lines for other services.

Low-cost, high-speed Internet access finally will be available to homes in Japan, at least those in Tokyo and the surrounding area, in the

summer of 2000. This breakthrough will be delivered by an unexpected source: SPEEDNET INC., a company formed by equal owners MICROSOFT CORP., SOFTBANK CORP. and TOKYO ELECTRIC POWER CO., INC. SpeedNet will use TEPCO's fiber-optic electricity transmission network. Subscribers will be linked to this backbone via an antenna-based technology known as a fixed wireless network. SpeedNet will bypass completely NIPPON TELEGRAPH AND TELEPHONE CORP.'s regional telephone network. Since the joint venture will not have to pay the stiff interconnection fees to NTT that are said to have retarded the growth of the Internet in Japan, the new ISP will be able to charge subscribers just a fraction of the \$88.50 or so a month that NTT plans to bill for a forthcoming flat-rate Internet service plan. Moreover, SpeedNet customers will have a faster connection: 1 gigabit per second versus the 64-kilobit-per-second access that the communications giant will offer. Microsoft and Softbank are talking about tying up with some of Japan's other nine regional electric utilities to bring inexpensive, fast Internet access to their service areas. Apartments, hotels, schools and any other place where there is a concentration of people can get fast Internet access for as little as \$17.70 a month per unit.

NICHIMEN CORP. is marketing this xDSL (**digital** sub-scriber line) service, which is made possible by ACU-COMM, INC. access products that the trader distributes (see Japan-U.S. Business Report No. 358, July 1999, p. 35). The Santa Clara, California company's equipment is much easier to install in existing buildings than, say, a local area network. At least for apartment residents, however, this means of Internet access can involve some heavy up-front costs since they or management must pay for the networking and customer premises equipment and its installation. Another potential drawback is that all the participants must sign up with the same ISP. Nonetheless, Nichimen is projecting revenues from the sale of AcuComm equipment at \$17.7 million to \$26.6 million in 2000.

JFAX.COM, an Internet-based messaging provider, has introduced its Unified Messaging service in Tokyo and Osaka through KUNI RESEARCH INTERNATIONAL CORP. The Los Angeles firm's service transforms a subscriber's e-mail box into a depository for faxes and voice mail as well as e-mail, with retrieval of e-mail and voice mail possible by phone or e-mail. People anywhere in the world can get a home or business phone number in Tokyo and Osaka from JFAX.COM, through which the company sends both faxes and voice mail.

Atlanta's IXL, INC., which advises Fortune 1000 companies on how the Internet can be used to their competitive advantage and draws on its in-house expertise to design, develop and deploy advanced Internet applications and solutions, has opened an office in Tokyo. Employees already are working with current iXL clients GENERAL ELECTRIC CO. and MERRILL LYNCH & CO., INC. to help them devise Internet strategies for Asia.

A second big-name company is distributing ESOFTE INC.'s TEAM line of Linux-based Internet access products for small businesses. TOMEN CORP. joins NTT ELECTRONICS CORP. (see Japan-U.S. Business Report No. 354, March 1999, p. 31) in handling the appliances, which provide low-cost LAN-to-Internet connectivity for companies with up to 200 workstations. Broomfield, Colorado eSoft's all-in-one devices include a Web server, firewall security, remote-access capability and VPN functionality.

Hoping to move farther into the Internet field, IN-TEL CORP.'s subsidiary is working with OKI ELECTRIC INDUSTRY CO., LTD., a big communications equipment maker that is trying to remake itself as an Internet-related firm, to develop computer-telephony devices for inexpensive but high-quality voice-over-Internet-Protocol communications. The development partners will draw on advances in Intel's processor technology both to shrink the size of the "Internet phone" and to add other capabilities to it, such as voice playback of e-mail messages or fax transmissions. The products, which could be commercialized as soon as next year, will be targeted at the Japanese market. Internet users interested in road or weather conditions in Iwate prefecture, one of Japan's main

vacation areas, can get this information thanks to the local government's installation of VORAXRD.COM's AddView system. The Sunnyvale, California company calls its package the first complete Internet streaming video service.

The Iwate prefecture installation consists of 54 cameras located along various roads, ISDN (integrated services **digital** network) **links** to local reflectors and satellite connections to the VoraRD.com AddView **server** in California. People accessing the service select the desired area from the 54-image menu. They then get a live image of traffic or weather at that location. A remote control feature allows the user to move the camera through a 160-degree arc and to zoom in on things of interest. A video network platform developed by MINER-VA SYSTEMS, INC. to address the video processing requirements of sophisticated IP networks is available from KANEMATSU ELECTRONICS LTD. The Mountain View, California company's Minerva VNP provides MPEG encoding and decoding for a variety of video networking applications. It incorporates an embedded processor running a real-time operating system as well as a state-of-the-art codec chip. Minerva claims that its MPEG network appliance is easier to integrate, more reliable, smaller in size and provides greater scalability than currently available PC-based encoders. Those features have led KEL to project sales of 300 systems in the first year at prices ranging from \$11,300 to \$36,700.

Having made a name for itself in the field of packet voice communications systems for voice/fax/data/ video networking over IP, frame relay and circuit-switched networks, NUERA COMMUNICATIONS, INC. has moved into the Japanese market. The San Diego, California firm chose TERILOGY CO., LTD. to distribute two of its products. For carrier customers, Nuera offers its new ORCA (open, reliable communications architecture) Internet telephony gateway, which provides supplier since sizes in Japan differ from those in the United States, where the company has its own factory, and in England, Germany and France, HCI's other international operations. However, the company will utilize the same sales formula of sending program participants four pairs of stockings every six weeks. They will have a choice of 10 colors in five sizes at prices ranging from \$3.55 a pair to \$4.40, which is less than department stores and other retailers in Japan charge for quality products.

TRANSPORTATION EQUIPMENT

Virtually all American Tier 1 automotive parts manufacturers lately have expressed renewed interest in the Japanese market. The Visteon Automotive Systems unit of FORD MOTOR CO., the world's second-largest parts supplier, has gone a big step further. For an undisclosed price, it acquired NALDEC CORP., a maker of advanced electronic body and safety vehicle modules, from MAZDA MOTOR CORP. The Hiroshi-ma- head-quartered company was formed in 1987 as an equally owned venture between now Ford-controlled Mazda and NEC CORP. The latter sold its share to its partner at the end of June in preparation for a divestiture. Naldec, which employs approximately 220 people, including about 70 engineers, had sales of \$88.5 million in the year through March 1999. During that period, it produced some 4 million air bag, antilock brake, keyless entry, speed control and other electrical modules, primarily for Mazda. The deal has obvious benefits for Mazda and Visteon alike. For the Japanese automotive maker, the sale is part of its financial comeback strategy of shedding nonessential businesses to focus on its core car and truck operations. It follows by roughly a month the sale of Mazda's financing unit to FORD MOTOR CREDIT CO. (see Japan-U.S. Business Report No. 359, August 1999, p. 20). For Visteon, the acquisition of Naldec not only gives it an onshore production capability and the means to expand business with other Japanese vehicle makers but also a source of manufacturing expertise that potentially can be applied to other operations around the world.

The 13-year-old manufacturing joint venture between DELPHI AUTOMOTIVE SYSTEMS CORP.'s Harrison Thermal Division and CALSONIC CORP. has announced plans to launch production for export of a next-generation air-conditioning

compressor that the two developed. CALSONIC HARRISON CORP., in which the biggest automotive parts supplier in the world has a 49 percent stake, will add to the output of its Utsunomiya, Tochigi prefecture factory in the fourth quarter a compact variable compressor that is said to generate less noise and vibration than conventional vehicle AC compressors. The plant now makes current-generation variable-displacement compressors for the Japanese market. At capacity operation, Calsonic Harrison will be able to turn out 450,000 CVC units a year, initially for BMW AG's European plants. The expansion will create about 170 jobs.

MISCELLANEOUS

One of the biggest makers of self-adhesive labels and other office paper products is moving into Japan with plans to quickly capture a significant share of this market. AVERY DENNISON CORP. is teaming with HITACHI MAXELL, LTD. to sell some 200 Avery-brand and cobranded self-adhesive labels, customized card products, related software and other office products to PC users with desktop printers. The Pasadena, California company will own 51 percent of AVERY DENNISON-MAXELL CO. Using Hitachi Maxell's marketing channels, the joint venture expects to have its products in outlets across Japan by January 2000. The Tokyo-headquartered business, to be staffed by managers and employees from both parents, is going after 30 percent-plus of the \$100 million market for labels and customized card products, with annual sales projected at \$26.6 million in three years. In time, Avery Dennison-Maxell plans to have a domestic manufacturing capability. Beginning January 1, 2000, CALLAWAY GOLF CO. will directly market its golf clubs and golf balls in Japan. SUMITOMO RUBBER INDUSTRIES, LTD. has had this job for the past 11 years. For reasons that were not given, the Carlsbad, California maker of the popular Big Bertha line of clubs and its distributor decided to end their relationship when the current marketing contract expires at the end of this year. Sales of Callaway products totaled a reported \$88.5 million in 1998. The firm already has a wholly owned Japanese subsidiary.

Combining technology licensed from TEXACO INC. for the production of fuel from sewage sludge with its own proprietary know-how, TERRABOND CO., LTD. codeveloped with MN ENGINEERING CO., LTD. a production process for what it calls combustible refuse slurry. In simplified terms, the system for making this environmentally beneficial fuel involves the separation of combustible organic household, industrial and commercial waste into low heat-generation products, such as garbage and paper, and those like waste plastics that have high heat-generation capabilities. These products then are carbonized, turned into an oil substance and/or pulverized into a slurry. Several mixings later, the slurry is transformed into a fuel. One of the key attractions of the CRS system is its ability to separate solids and liquids from the same waste. Tokyo-based Terrabond, an environmental plant developer, now is seeking companies to utilize its fuel production system. Texaco signed the licensing agreement with Terrabond in January 1999. The arrangement explicitly excludes the White Plains, New York-headquartered oil major's gasification technology.

Two AMERICAN FIRETECT, INC

fire-retardant chemicals already are on the market in Japan through distributor CUBIC CORP.: the Safe-T-Guard fire retardant for on-bolt fabric, the Feasterville, Pennsylvania company's key product, and a Safe-T-Guard fire retardant for the treatment of wood products. Cubic, a specialty chemical trader located in Tokyo, now is in the process of introducing two other American Firetect products. One is a paint that, used on boats, enables barnacles, seaweed and other material sticking to the vessel's surface to be washed off. The paint also can be applied to the inside of pipes in sewage treatment plants, thereby allowing built-up sludge to be removed through washing. The other new product controls odors in, for example, water-treatment facilities YLA CELLULAR PRODUCTS CO., a Livermore, California manufacturer of specialty honeycomb materials sold under the ULTRACOR brand, named TOKYO TECHNOLOGIES, INC. to sell two of its cutting-edge products to Japanese aerospace companies. ULTRA-COR is a very

low-density honeycomb core material designed for use in highly weight-sensitive structures, including satellite antenna reflectors and solar arrays.

Unlike the hexagonal or square cell shapes of other makers' honeycomb material, ULTRACOR incorporates a web construction. That difference means that a honey-comb can be produced from any structural fiber and that the fiber can be oriented in any desired direction or in more than one direction. The ULTRACOR products available in Japan are a carbon-carbon honeycomb with a 3/8-inch cell size and a one-fourth-inch quartz-fiber honeycomb. Tokyo Technologies' marketing **rights** extend to other Asian countries.

Medical institutions in Japan soon will have help in preventing and controlling infectious diseases in their facilities. The initiative is spearheaded by COLBY GROUP INTERNATIONAL, INC. of Edmonds, Washington, which specializes in transpacific biomedical business and technical relations. It has enlisted the cooperation of the ASSOCIATION FOR PROFESSIONALS IN INFECTION CONTROL AND EPIDEMIOLOGY, INC., a nonprofit, voluntary, international organization based in Washington, D.C., to establish an APIC-like group of infection-control professionals in Japan. This organization will draft voluntary standards for preventing and controlling infectious diseases in medical settings. Colby Group then plans to tie up with Japanese pharmaceutical companies in an organization that will help hospitals and other medical institutions meet the new standards.

MEDTAP INTERNATIONAL, INC., a health-services research firm based in Bethesda, Maryland, has teamed with Tokyo's CRECON RESEARCH & CONSULTING, INC. to offer what they call pharmacoeconomics consulting and research services to drug companies around the world. MEDTAP will contribute to the alliance its technical expertise as well as business support in the United States and Europe. Crecon, in turn, will provide its technical and market research knowledge of the Japanese market. With this input, MEDTAP will be better positioned to serve its multinational clients on a global basis. At the same time, Crecon should be able to respond more effectively to the growing demand in Japan for socioeconomic evaluations of health-care issues.

In a deal that should help fuel the growth of the investment trust or mutual fund industry in Japan, STANDARD & POOR'S CORP. acquired IFIS INC., one of the country's few independent sources of information and analysis on domestic mutual funds. The three-year-old Tokyo company provides data on 1,800 Japanese open-ended funds and 3,200 closed ones. IFIS market trackers have joined the analytical team that S&P has had in Tokyo since 1986. The acquisition, the terms of which were not disclosed, also bolsters S&P's claim of being the world's leading provider of independent mutual fund information and analysis.

Another American advertising agency is altering its relationship with its Japanese partner. In this instance, YOUNG & RUBICAM INC., which ranks fifth in the world in terms of billings, and DENTSU INC., Japan's top ad agency, are restructuring the ownership of three in-country joint ventures and 12 elsewhere in Asia in the hope of generating more business. In Japan, Y&R and Dentsu will switch their shareholdings, with the Manhattan firm becoming the minority (49 percent) partner in the trio. In the dozen non-Japanese companies, now equally owned, Y&R will increase its stake to two-thirds. Y&R and Dentsu have had a Manhattan tie-up since 1981.

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RioPort, Inc. and Universal Music Group Agree to Make Music Content Available To SDMI-Compliant RioPort Platform.
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SAN JOSE, Calif.--(BUSINESS WIRE)--July 20, 1999--

RioPort Platform Will Offer Popular New

Digital Music to Consumers

RioPort, Inc., a wholly owned subsidiary of Diamond Multimedia Systems, Inc. (Nasdaq:DIMD), today announced that Universal Music Group will deliver secure, popular music to RioPort's SDMI-compliant portable flash memory devices and will develop an initiative to harmonize **digital** delivery services offered by both companies in the future.

RioPort will be one of the first **digital** audio platforms to offer a broad range of content from Universal Music Group's record labels, which include Interscope, A&M, Island, Def Jam, Geffen, MCA, Universal, Motown, GRP and Verve, among others. Trials are expected to begin in the fall and content will be available to consumers this winter.

"Universal Music Group's support of the RioPort platform is great news for **digital** audio enthusiasts worldwide," said David Watkins, president of RioPort, Inc. "RioPort and Universal will work closely together to integrate and promote Universal's music content with our RioPort.com web site and SDMI-compliant Rio portable **digital** audio players. We hope that our agreement with Universal is one of many that will deliver popular music content to RioPort customers."

Larry Kenswil, President, Electronic Commerce and Advanced Technology, Universal Music Group comments, "UMG will support our artists by providing the broadest and deepest reach for their music. We encourage SDMI standards and are happy that RioPort is one of the first to announce a compliant device."

Both RioPort and Universal are supporting InterTrust as a preferred provider of **digital rights** management technology to ensure the protection of content copyright holders. Early on, RioPort partnered with InterTrust and Reciprocal to ensure the security of content delivery through its RioPort.com site, Rio Audio Manager software and Rio

portable playback solutions.

"Our deal with Universal Music Group recognizes that the Internet is becoming a viable distribution system for the delivery of **digital** content," said J.D. Heilprin, general manager and publisher of RioPort.com. "Universal Music Group is the world's largest music company and having access to their content assures RioPort and its network of affiliate sites, a tremendous offering of music tracks from leading artists as well as popular catalog content."

Universal Music Group will be integrating content through Rio Search, RioPort's powerful search engine, allowing consumers to access, purchase and download popular content not previously available in **digital** content through the www.rioport.com website, as well as affiliate partner sites. Additionally, consumers will be able to enjoy this new content in their own environments without being tied to their PC by using Rioport-compatible players, such as the new SDMI-compliant Rio portable music players expected to ship later this year.

The RioPort.com site delivers broad access to a vast selection of legitimate **digital** music and spoken audio content. In addition to Universal, RioPort is in talks with **other** major **content** providers to secure a range of popular music for its customers. Currently, consumers can find hundreds of **links** to **digital** audio **content** aggregated from the best sources on the Internet on the RioPort.com site. Content is intuitively organized throughout the site, making it quick and easy for fans to find exactly what they are searching for.

RioPort, Inc.

RioPort, Inc. is redefining **digital** audio by delivering an integrated platform for acquiring, managing and experiencing music and spoken audio programming from the Internet. RioPort delivers an extensive selection of **digital** music and spoken audio programming through its RioPort.com **digital** audio gateway, full content management with its Rio Audio Manager software and cutting-edge playback solutions with its RioPort-compatible players.

Company headquarters are in San Jose, Calif., where its business development, engineering and marketing team is located. RioPort's artist relations, content aggregation and online creative team is based in Los Angeles, and its portable player design team is based in Korea.

Universal Music Group

Universal Music Group is the world's leading music company with wholly-owned record operations or licensees in 59 countries around the world. Its businesses also include Universal Music Publishing Group, one of the industry's largest global music publishing operations, and Universal Concerts.

Universal Music Group consists of record labels A&M, Blue Thumb, Decca Record Company, Def Jam, Deutsche Grammophon, Geffen, GRP, Impulse!, Interscope, Island, MCA, MCA Nashville, Mercury, Mercury Nashville, Motown, Philips, Polydor, Universal, and Verve as well as a multitude of record labels owned or distributed by its record company subsidiaries around the world. Universal Music Group is a unit of The Seagram Company Ltd., a global entertainment and spirits and wine company.

About Diamond Multimedia

Diamond Multimedia is a leader in PC multimedia and Internet connectivity, providing advanced products that enable desktop computer users to create, access and experience compelling new media content from their PC's and through the Internet.

Products include the Rio series of Internet audio appliances, the Stealth and Viper(R) series of video accelerators, the Monster series of 3D gaming accelerators, the Fire series of professional graphics accelerators, the Supra(R) series of modems, and the HomeFree line of home networking products. Diamond's common stock is traded on the NASDAQ under the symbol DIMD, and its web site address is www.diamondmm.com.

The Company's Internet **digital** audio portal site is at

www.rioport.com and its e-commerce site is at www.estore.diamondmm.com.

How to Contact Diamond Multimedia

There are many ways to reach Diamond for sales support, technical assistance, driver updates and general information:

Internet Web Site: www.diamondmm.com and www.rioport.com E-Commerce Site: www.estore.diamondmm.com Diamond Multimedia's Headquarters and Multimedia Division:

408/325-7000; Fax: 408-325-7070 Communications Division (Supra brand modems) Main Phone Number:

360-604-1400; Fax: 360-604-1401 European Division (Germany): +49-8151-266-0; (UK): +44-1189-444400;

(France) +33-1-55381600 Korean Office (Seoul): +82-2-2185-3388; Fax: +82-2-501-7522 Japanese Office (Tokyo): +81-3-5695-8401; Fax: +81-3-5695-8403 ASEAN Office (Singapore): + 65-353-9511; Fax: +65-353-9510 Hong Kong Office: +852-2262-9518; Fax: +852-2262-9555 Australian Office (Sydney): +61-2-9460-2355; Fax +61-2-9460-2360 Latin America Office (Miami): 305-593-8777; Fax: 305-593-2779 Product Support (Voice), United States: 541-967-2450; Europe

(Germany) +49-8151-266-330; Europe (UK) +44-1189-444444;

Europe (France) +33-1-55381616; TDD/TTY Support 541-967-2451 Product Support (Fax), United States: 541-967-2401; Europe (Germany)

+49-8151-266-331; Europe (UK): +44-1189-444445;

(France) +33-1-55381601 Pre-sales Information: 1-800-468-5846 24-Hour Fax-On-Demand Service: 1-800-380-0030 Investor Relations: 408-325-7476; 1-888-474-3463 (U.S. and Canada) FTP site: ftp.diamondmm.com BBS: Europe (Germany) BBS at +49-8151-266333 (to 28.8 Kbps) or

+49-8151-266334 (ISDN); Europe (UK) at +44-1189-444415 (to 33.6 Kbps)

Note to Editors: HomeFree, Monster 3D, Rio, Shotgun, SpeedStar and SupraSonic are either trademarks or registered trademarks of Diamond Multimedia Systems, Inc. Monster is a registered trademark of Monster Cable. Viper is a registered trademark of Directed Electronics, Inc., Used **under License**. All other trademarks referenced are the service mark, trademark or registered trademark of their respective manufacturers. This announcement relates to products whose introductions are in North America. The product name, contents, prices and availability may differ elsewhere in the world according to local factors and requirements.

Except for historical information contained herein, the matters set forth in this press release, such as statements relating to the Company's ability to successfully exploit technological and market developments, the timing and success of new product introductions by the Company and its competitors, and the Company's ability to invest in new technologies and to enhance its existing systems are forward-looking statements that are subject to risks and uncertainties, including the impact of competitive products and pricing and alternative technological advances, the timely and successful development and market acceptance of new products and upgrades to existing products, and other risks as detailed from time to time in Diamond Multimedia's SEC filings, including its most recent Forms 10-K and 10-Q.

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RioPort Inc. and Universal Music Group Agree to Make Music Content Available to SDMI-Compliant
RioPort Platform; RioPort Platform Will Offer Popular New Digital Music to Consumers

Business Wire

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Universal Music Group is a unit of The Seagram Company Ltd., a global entertainment and spirits and wine company.

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How to Contact Diamond Multimedia

There are many ways to reach Diamond for sales support, technical assistance, driver updates and general information:

Internet Web Site: www.diamondmm.com and www.rioport.com

E-Commerce Site: www.ystore.diamondmm.com

Diamond Multimedia's Headquarters and Multimedia Division:

408-325-7000; Fax: 408-325-7070

Communications Division (Supra brand modems) Main Phone Number:

360-604-1400; Fax: 360-604-1401

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(France) +33-1-55381600

Korean Office (Seoul): +82-2-2185-3388; Fax: +82-2-501-7522

Japanese Office (Tokyo): +81-3-5695-8401; Fax: +81-3-5695-8403

ASEAN Office (Singapore): +65-353-9511; Fax: +65-353-9510

Hong Kong Office: +852-2262-9518; Fax: +852-2262-9555

Australian Office (Sydney): +61-2-9460-2355; Fax +61-2-9460-2360

Latin America Office (Miami): 305-593-8777; Fax: 305-593-2779

Mexico Office (Guadalajara): 523-110-1144; Fax: 523-110-0744

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Product Support (Fax), United States: 541-967-2401; Europe (Germany)

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Pre-sales Information: 800-468-5846

24-Hour Fax-On-Demand Service: 800-380-0030

Investor Relations: 408-325-7476; 888-474-3463 (U.S. and Canada)

FTP site: [ftp.diamondmm.com](ftp://ftp.diamondmm.com)

BBS: Europe (Germany) BBS at +49-8151-266333 (to 28.8 Kbps) or

+49-8151-266334 (ISDN); Europe (UK) at +44-1189-444415 (to 33.6 Kbps)

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**Event Names: CORPORATE GROUPS AND OWNERSHIP; NEW PRODUCT DEVELOPMENT;
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(ENL) LEXIS Publishing Introduces Lexis.com Research System at AALL Annual Meeting; Customer Needs Drove System Design

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WASHINGTON, Jul 19, 1999 (BUSINESS WIRE via COMTEX)

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Association of Law Libraries Annual Meeting -- LEXIS Publishing(TM), which unites and leverages the strengths of the legal industry's leading product and services, today redefined the legal research process with the introduction of the lexis.com(SM) research system.

The new system leverages the exclusive mix of rich intellectual property, innovative technology and deep editorial expertise that is the heritage of LEXIS Publishing. It also integrates new tools for finding, analyzing and validating information. The new system presents a superior alternative to the West Key Number System(R) and headnote hierarchy by bringing new efficiency and stellar results to customers' research efforts.

"The lexis.com research system gives legal professionals a much-needed alternative that combines the best of SHEPARD'S(R) Citations, Matthew Bender(R) treatises and LEXIS(R) online," said Bill Pardue, vice president and publisher, LEXIS Online Publishing. "Our customers' needs drove the system's design to ensure that they can spend more time analyzing on-point cases, not finding them."

To develop the system, the company conducted research over the past 18 months among a total of 6,000 lawyers, librarians, paralegals and law students.

The first phase of the legal research system will be available through a new lexis.com web interface in August 1999. It integrates tools enhancing a wide range of research activities:

Finding

To assist users in initiating their research, the LEXIS Publishing team of experts created a new classification structure for legal content that is built on practice areas, such as trademark, copyright and tax law. LEXIS Publishing is introducing two innovative products that will be available on the lexis.com service in August using this structure: LEXIS(R) Search Advisor and Searchable Core Terms.

- LEXIS Search Advisor--A finding tool for legal materials based on areas of law and related topics. LEXIS Search Advisor can target a legal issue, identify an appropriate source and formulate a research request. Researchers can create effective searches by pointing and clicking on selected legal topics, as well as related legal terms. This clear and intuitive system has been created in part through the use of respected Matthew Bender(R) treatises, and reviewed for accuracy and comprehensiveness by expert editors. LEXIS Search Advisor is a dynamic, evolving product that is continually updated.
- Searchable Core Terms--Searchable Core Terms offers a precision finding tool allowing researchers to focus on specific words or phrases of particular significance within caselaw and agency documents. Core Term searches may be conducted with LEXIS Search Advisor or independently.

Reading and Analyzing

These tools assist legal professionals in finding on-point, relevant case law.

- Core Terms--Available since August 1998, Core Terms display at the beginning of a case on the lexis.com service in descending order of significance. The terms are drawn directly from the court's or agency's own language as it appears in the opinion.
- Case Summaries--Short and concise summaries of the essential issues and outcomes of court cases, Case Summaries are being written by lawyers on the staff of LEXIS Publishing. They will be available in the first quarter of 2000.
- Core Concepts--Core Concepts are categorized by the legal topics found in the LEXIS Search Advisor classification system. Available in the first quarter of 2000, the concepts will highlight major points of law that a court addresses and track closely the language of the court.

Finding More

Frequently, the legal research process requires exploring additional avenues of research based on preliminary search results. LEXIS Publishing products and services will continue to add cutting-edge functionality to help users explore these paths.

- Classification system--The classification system is comprised of practice areas of law and related topics, forming the basis both for Search Advisor and for the labeling of Core Concepts. This editorially enhanced system has been created through the expertise of Matthew Bender editors and authors as well as the skills of LEXIS-NEXIS researchers and technologists.
- Selected Text--Available to users since August 1998, Selected Text enables researchers to use a relevant passage within a case as the basis to retrieve additional documents that closely resemble that passage, dealing with either factual or legal issues, or both.

Validating

LEXIS Publishing offers legal researchers two newly updated tools for validating research results:

- SHEPARD'S(R) Citations Service--Introduced in March, the new version of SHEPARD'S on the LEXIS-NEXIS services incorporates new search and navigation features that allow legal researchers even easier and more complete access to published and unpublished decisions. Through this service, the full LEXIS-NEXIS caselaw database is available for citations research.
- CheckCite(TM) 2000 software--Introduced in May, this all-new product extracts all of the cites from a document at once, automatically going online to retrieve pertinent information from the new SHEPARD'S Citations Service and lexis.com service. Then the program creates a full report, detailing subsequent appellate history, direct cite **references** and whatever **other content** the user requests.

The research system is presented via an entirely new user interface, the lexis.com service. In addition to the components of the research system itself, this easy-to-use interface incorporates five significant changes from Xchange(TM), the existing LEXIS-NEXIS web-based research service:

- Updated home and research pages, making it even easier to select sources and access information quickly
- An easy-to-use search form, providing the functionality needed to do a search
- Source and topical index "trails" that reinforce where the user is and facilitate better navigation
- Streamlined functionality and graphics that improve performance
- A stationary navigation bar that allows for easier access to features to browse search results

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